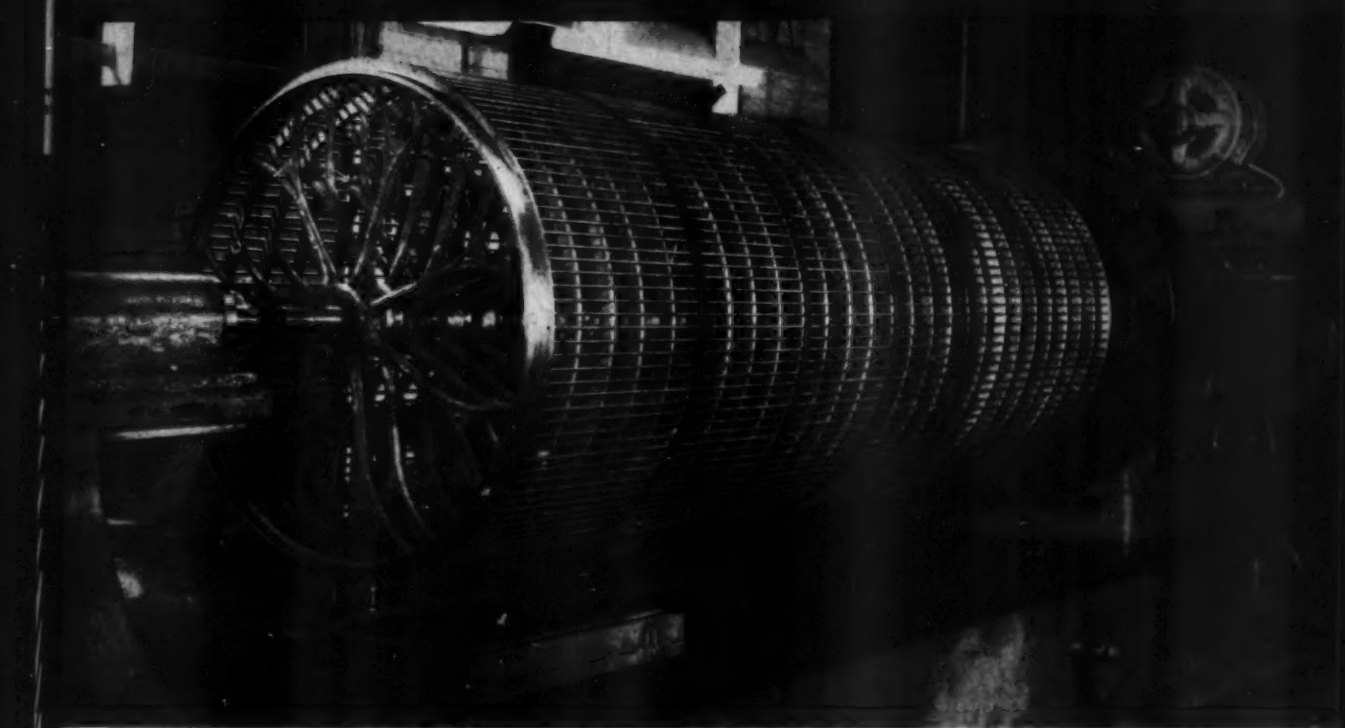
THE PAPER INDUSTRY
and PAPER WORLD



Get the ADVANTAGES of

NEW IDEAS built into old Cylinders

If your cylinders are basically sound, we at Cheney Bigelow can rebuild them.

We can often incorporate many of the exclusive improvements developed at Cheney Bigelow and proved in actual paper mill operations. We refer to the new cylinder surface constructions such as house-shaped rods and high wire; improved chime rings; new type cylinder seals, stiffening rods, etc.

When a mould is received from you for survey we subject it to a careful examination. If in our judgment repairs are inadvisable we tell you so, frankly. You can be certain that your rebuilt cylinder mould will be perfectly balanced, with a surface free from any hollow or flat spots. The work will be done promptly and the price will be reasonable.

Let us give you more information. Write Cheney Bigelow Wire Works, Springfield 7, Massachusetts.

PULP & PAPER

CB

MILL EQUIPMENT

Cheney Bigelow

SPRINGFIELD, MASSACHUSETTS

HERE'S SOMETHING *NEW* IN

Twisting Tissue

OTHER CHEMICALS FOR THE PAPER INDUSTRY

AMBERLITE W-1—a water soluble polymer for improving the dry and wet tensile and Mullen, as well as the fold and the abrasion resistance of paper.

RHOZYMES BB and E-5—for enzyme conversion of starch.

TAMOL P—for effective pitch control, a dispersing agent for pigments.

TRITONS—surface-active agents with a dozen uses in paper manufacture—for increasing absorbency, controlling foam, de-inking waste, cleaning felts, processing raw cotton or rags, dispersing pigments, improving penetration of sizes, etc.

The **Hydrosulfites**—reducing agents for stripping color from rag stock or for bleaching pulp.

HYAMINES—quaternary ammonium germicides and deodorants used to produce bacteriostatic papers and paper board.

UFORMITE, AMBERLITE, RHOZYME, TAMOL, TRITON, HYAMINE *are trade-marks, Reg. U.S. Pat. Off. and in principal foreign countries.*

The UFORMITES for Paper

Your copy of this free booklet will answer your technical questions about the UFORMITES and how they are used to increase wet strength. Write for it today. Dept. PI-2.

This new twist keeps twisting tissue from breaking in the machine. It's the UFORMITES—urea formaldehyde resins used to wet-strengthen paper. Wherever they are used, tissue can be made into twine more speedily and less expensively.

UFORMITES are easy and economical to use. No pre-treatment or special equipment is necessary. Simply add a small quantity of UFORMITE resin to the pulp before sheet formation. Then wet tissue can be twisted with much less breakage because UFORMITE boosts wet strength 300%. The saving in "breakage-time" more than pays for the resin.

In bag and liner stocks, paper towels, glassine, locker wrap, map paper, blueprint and tag stocks too, you'll find the UFORMITES giving maximum strength at minimum cost. In Kraft stocks, a three-fold increase in wet tensile strength is typical. And similar increases can be obtained in both sulfite and groundwood stocks. Write today for full details of the UFORMITES.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

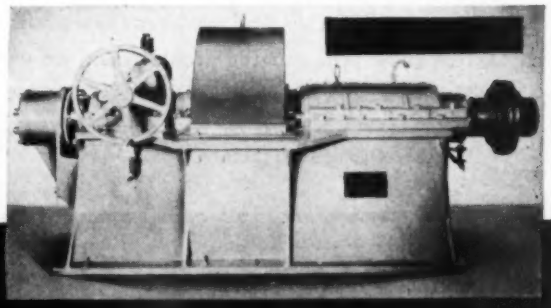
Washington Square Philadelphia 5, Pa.

The Resinous Products Division was formerly The Resinous Products & Chemical Company

A Little Refiner—A Long Way from Home But Read what it did in only 4 Days

"To date, we have effected approximately 10% increase in production with improved formation and physical properties. One especially notable result has been that the sizing is greatly improved due to the more uniform degree of refining which we are now getting."

The foregoing was taken from a letter from a new Sutherland user in South Africa, about 10,000 miles from Trenton, who was obviously delighted with the performance of their small 32" refiner. It's exactly what we've been telling mills for years, i.e., **Increased Production, Better Formation, Higher Strength, Improved Finish,** etc. guaranteed by Sutherlands. Mills now considering stock preparation equipment, which are much closer to our free technical service, should take particular note. **P.S. Many have already learned what this South African mill just found out.**

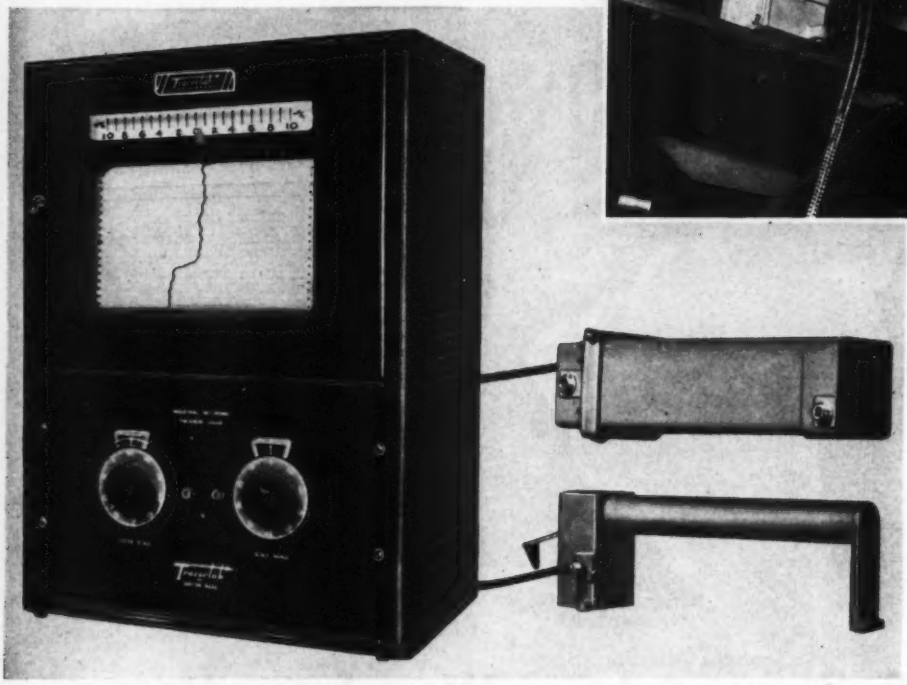


SUTHERLAND REFINER CORPORATION
TRENTON, NEW JERSEY

Manufactured in the United States by Valley Iron Works Co., Appleton, Wisconsin • Sutherland Refiner Ltd., Windsor Hotel, Montreal, P. Q.

CUT COSTS

BY IMPROVING BASIS WEIGHT CONTROL



A Tracerlab Beta Gauge installation for measuring paper board at Continental Paper Co., Ridgefield Park, New Jersey.

•

A FEW TYPICAL USES

Measuring weight per unit area or thickness of the following:

PLASTIC COATED PAPER
PAPER BOX BOARD
TISSUE PAPER
STATIONERY
PAPER BUILDING BOARD
LEDGER PAPER
CONDENSER PAPER
WAXED PAPER
PARCHMENT
FACIAL TISSUE
ASPHALT COATED PAPER
CARBON PAPER
KRAFT
GLASSINE PAPER

SHORTEN STARTUP TIME • IMPROVE QUALITY CONTROL • SAVE PULP STOCK
ELIMINATE OFF-WEIGHT REJECTS • DECREASE VARIATIONS ACROSS SHEET

WITH THE NEW TRACERLAB BETA GAUGE

The Tracerlab Beta Gauge is a completely new and unique instrument for measuring and recording weight per unit area or thickness of various materials directly on the production line. It uses beta radiation from Oak Ridge produced radioisotopes to achieve a high degree of accuracy and sensitivity and is unaffected by variations in chemical composition of the material being measured. This is a non-contacting type of gauge designed for the severe operating conditions usually encountered in production operations. In addition to the recording type, a non-recording industrial model and a laboratory model of the Tracerlab Beta Gauge are also available.

Let us know your gauging problems and we will gladly advise you how the Tracerlab Beta Gauge can help you.

Write for Beta Gauge Bulletin P-W-20

Tracerlab

Western Division
2295 San Pablo Ave., Berkeley 2, California
New York Office
General Motors Building, 1775 Broadway, New York 19
Midwest Office
LaSalle-Wacker Bldg., 221 N. LaSalle St., Chicago, Ill.

TRACERLAB INC., 130 HIGH STREET, BOSTON 10, MASS.

PMAS

the highly efficient

SLIMICIDE

suitable for AUTOMATIC FEEDING

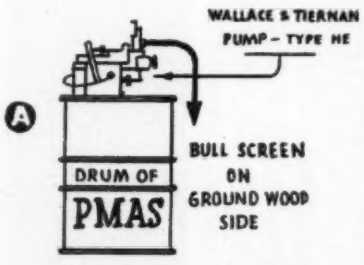
1. Maximum effectiveness
2. Minimum cost
3. No precipitation
4. Gives no odor to paper

PMAS is a STABLE WATER SOLUTION, containing 10% phenyl mercuric acetate made soluble in an organic complex. Extensively used in the control of slime in paper-making and in a variety of other industrial uses, it does not precipitate at a high or low pH or in the presence of oxidizing agents such as chlorine.

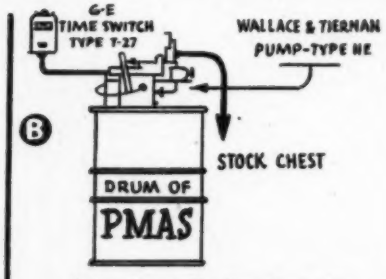
PMAS can be fed into the system with automatic equipment, directly from the shipping container. The methods used in three typical examples of automatic feeding are illustrated in diagrams A, B and C below.

Write today for further information.

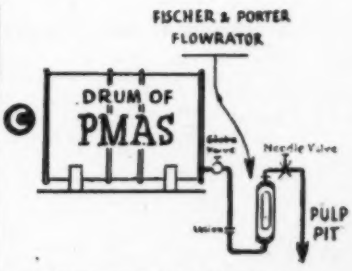
Typical examples of automatic feeding with PMAS



Continuous feeding in a 700-Ton Newsprint Mill—dosage 2 ozs. per ton.



Intermittent Feeding in a 100-Ton Paperboard Mill—dosage 6 oz. per ton. Feeding 5 days per week, 1 hour of each 8-hour shift.



Continuous feeding in 8-ton tissue paper mill—dosage 2 oz. per ton.

W. A. CLEARY CORPORATION

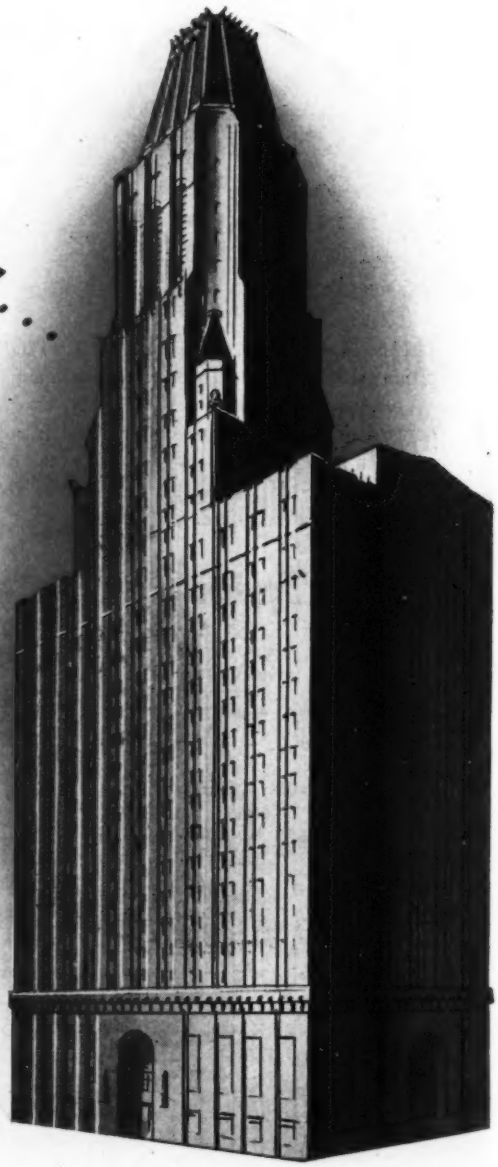
New Brunswick, N. J. Chicago, Ill.

Belleville, Ont., Canada

Mathieson
CHEMICALS

SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

Mathieson's BALTIMORE *bound . . .*



● This fall, Mathieson Chemical Corporation moves to its new executive offices in the 34-story Mathieson Building, Baltimore, Maryland.

In this new location, deep in the chemical heartland of America, we will continue to serve our customers quickly and efficiently.

Mathieson Chemical Corporation
MATHIESON BUILDING
BALTIMORE 3, MARYLAND

THE PAPER INDUSTRY and PAPER WORLD

(Reg. U. S. Pat. Off.)

An Educational News Magazine

VOLUME 31 - - - - - - - - - - SEPTEMBER, 1949 - - - - - - - - - - NUMBER 6

Published monthly by
FRITZ PUBLICATIONS, INC.

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Published at
404 North Wesley Avenue
Mount Morris, Illinois

●

Address all correspondence to
Editorial and Executive Office
59 East Van Buren Street
Chicago 5, Illinois

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EDWARD B. FRITZ
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The Associated Business Publications

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Entered as second class matter December 13, 1948, at the post office at Mount Morris, Ill., under the Act of March 3, 1879. Subscriptions in the United States, U. S. Possessions, Canada, and Pan American countries $2.00 for one year, $3.00 for two years. All other countries $3.00 for one year, $5.00 for two years.

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THE PAPER INDUSTRY and PAPER WORLD is indexed regularly in *Engineering Index* and *Industrial Arts Index*. An index to each volume is issued annually by the publisher as Section Two of the April number.

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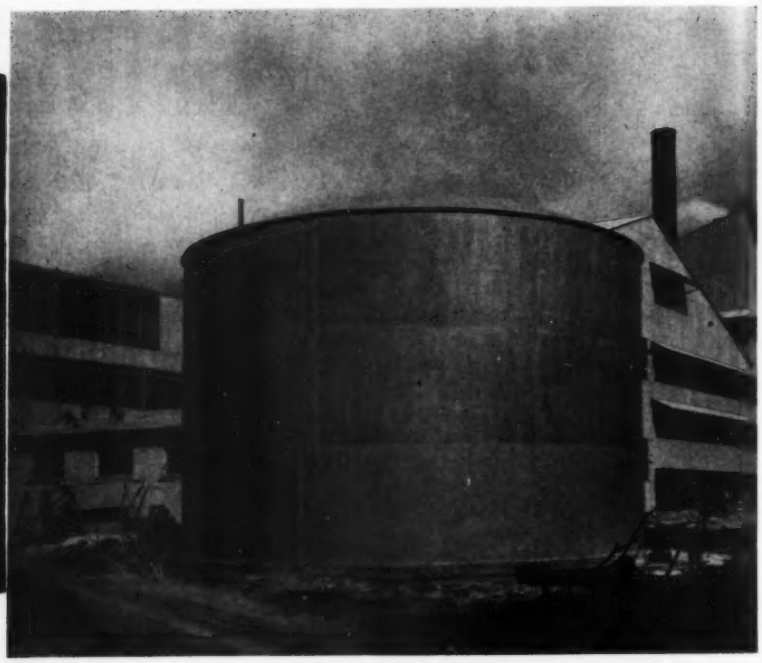
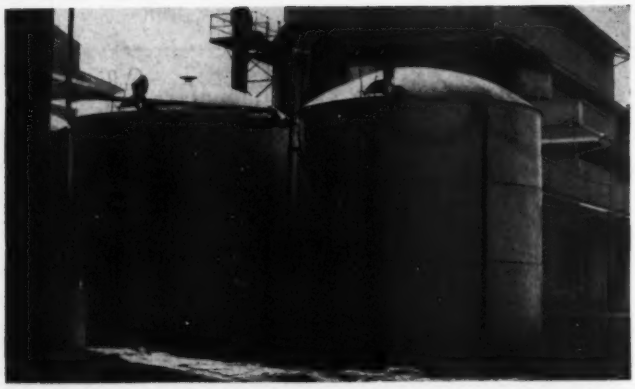
Have you the right PERSPECTIVE for 1950?





Above: Two 12-ft. diam. by 15-ft. high caustic storage drums. Below: 7,500-gal. sulfur dioxide storage tank. Both these installations are located at the St. Regis Paper Company's Cantonment, Florida, plant.

Meet the buyer's market with Modern Equipment that lowers production costs

YOU can start now—right in your own plant—to meet the 1950 buyer's market. Take a critical look at your production facilities and decide if it is really wise to "get-by" with obsolete equipment. Very likely you'll find—as have wise managers in petroleum refining, chemical processing and other industries—that modern equipment is a sound investment because it lowers production costs and thereby improves your competitive position. And all three industries—pulp, petroleum and chemical—rely on C B & I-built steel plate work and storage tanks to do everything from the most specialized processing to the simplest storage job.

The list of equipment which we design, fabricate and erect for the paper industry includes sulphate and sulphite digesters, diffusers, spherical acid accumulators, pulp washing tanks, flat-bottom storage tanks and elevated water tanks. Special non-corrosive linings can be furnished and x-raying and stress-relieving are done when required. To get the "right perspective" on what modern equipment will do for you in 1950, write our nearest office. We'll furnish complete details and quotations.

Top; 36-ft. diam. by 22-ft. suction tank at the St. Regis Paper Company's plant at Cantonment, Fla.

CHICAGO BRIDGE & IRON COMPANY

Atlanta, 3.....2143 Healey Building
Birmingham, 1.....1511 North 50th Street
Boston, 10.....1026—201 Devonshire Street
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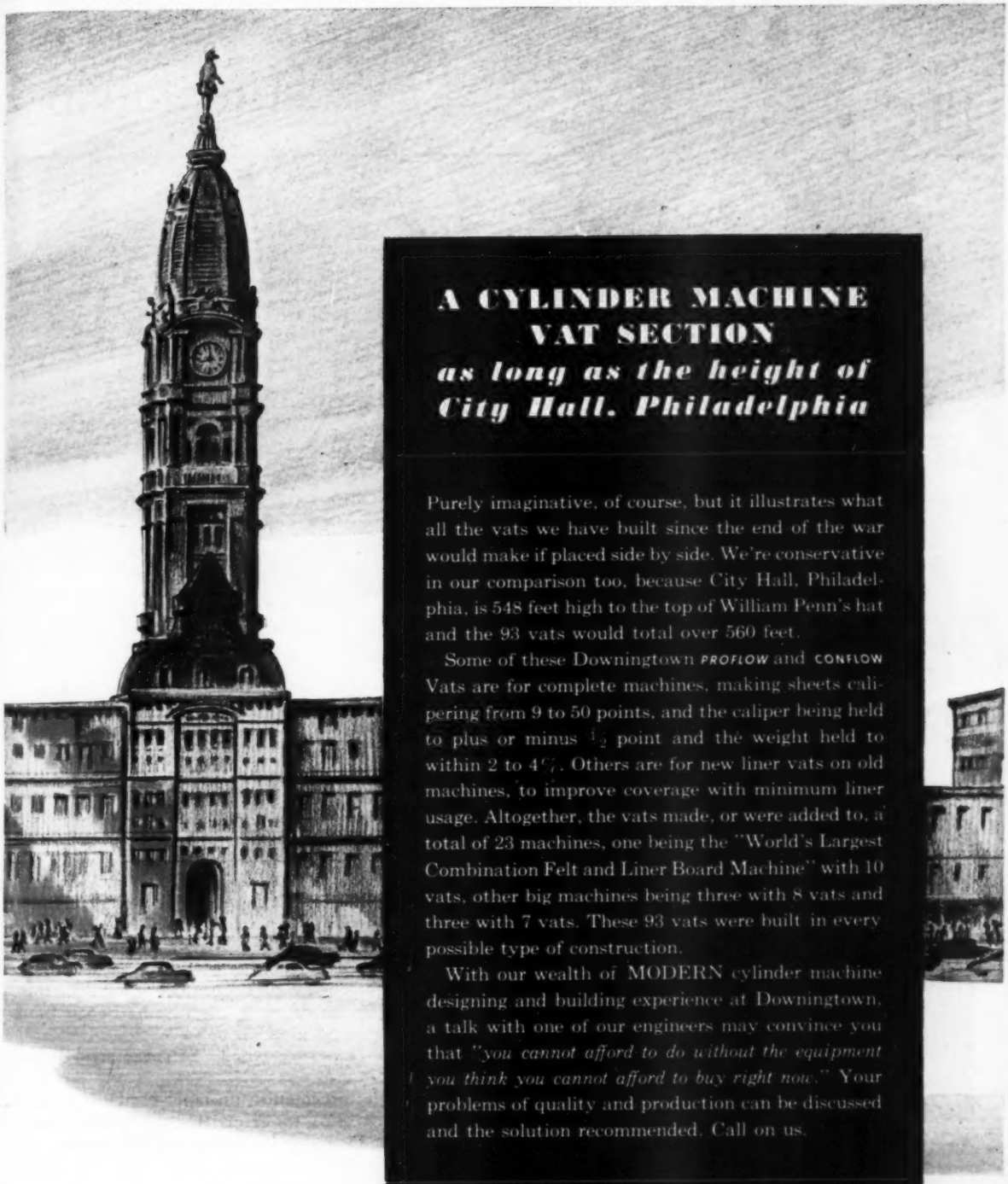
Cleveland, 15.....2267 Guildhall Building
Detroit, 26.....1566 Lafayette Building
Havana.....402 Abreu Building
Houston, 2.....2143 National Standard Building
Los Angeles, 14.....1559 General Petroleum Building
New York, 6.....3350—165 Broadway Building
Philadelphia, 3.....1653—1700 Walnut Street Building
Salt Lake City, 1.....1527 First Security Bank Building
San Francisco, 11.....1217—22 Battery Street Building
Seattle, 1.....1327 Henry Building
Tulsa, 3.....1651 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.



A CYLINDER MACHINE VAT SECTION

as long as the height of City Hall, Philadelphia

Purely imaginative, of course, but it illustrates what all the vats we have built since the end of the war would make if placed side by side. We're conservative in our comparison too, because City Hall, Philadelphia, is 548 feet high to the top of William Penn's hat and the 93 vats would total over 560 feet.

Some of these Downingtown PROFLOW and CONFLOW Vats are for complete machines, making sheets calipering from 9 to 50 points, and the caliper being held to plus or minus $\frac{1}{2}$ point and the weight held to within 2 to 4%. Others are for new liner vats on old machines, to improve coverage with minimum liner usage. Altogether, the vats made, or were added to, a total of 23 machines, one being the "World's Largest Combination Felt and Liner Board Machine" with 10 vats, other big machines being three with 8 vats and three with 7 vats. These 93 vats were built in every possible type of construction.

With our wealth of MODERN cylinder machine designing and building experience at Downingtown, a talk with one of our engineers may convince you that *"you cannot afford to do without the equipment you think you cannot afford to buy right now."* Your problems of quality and production can be discussed and the solution recommended. Call on us.

DOWNINGTOWN MANUFACTURING COMPANY

DOWNINGTOWN, PA.

DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY SINCE 1880

YOU CAN BE **SURE**.. IF IT'S

Westinghouse

Hard and Tough

this "taper-hardened" tooth bends before it breaks

Taper-Hardened Tooth Section

Case-Hardened Tooth Section

The taper-hardened tooth above bent under the same force that snapped the case-hardened tooth. Yet a test will show wearing surfaces of nearly equal hardness.

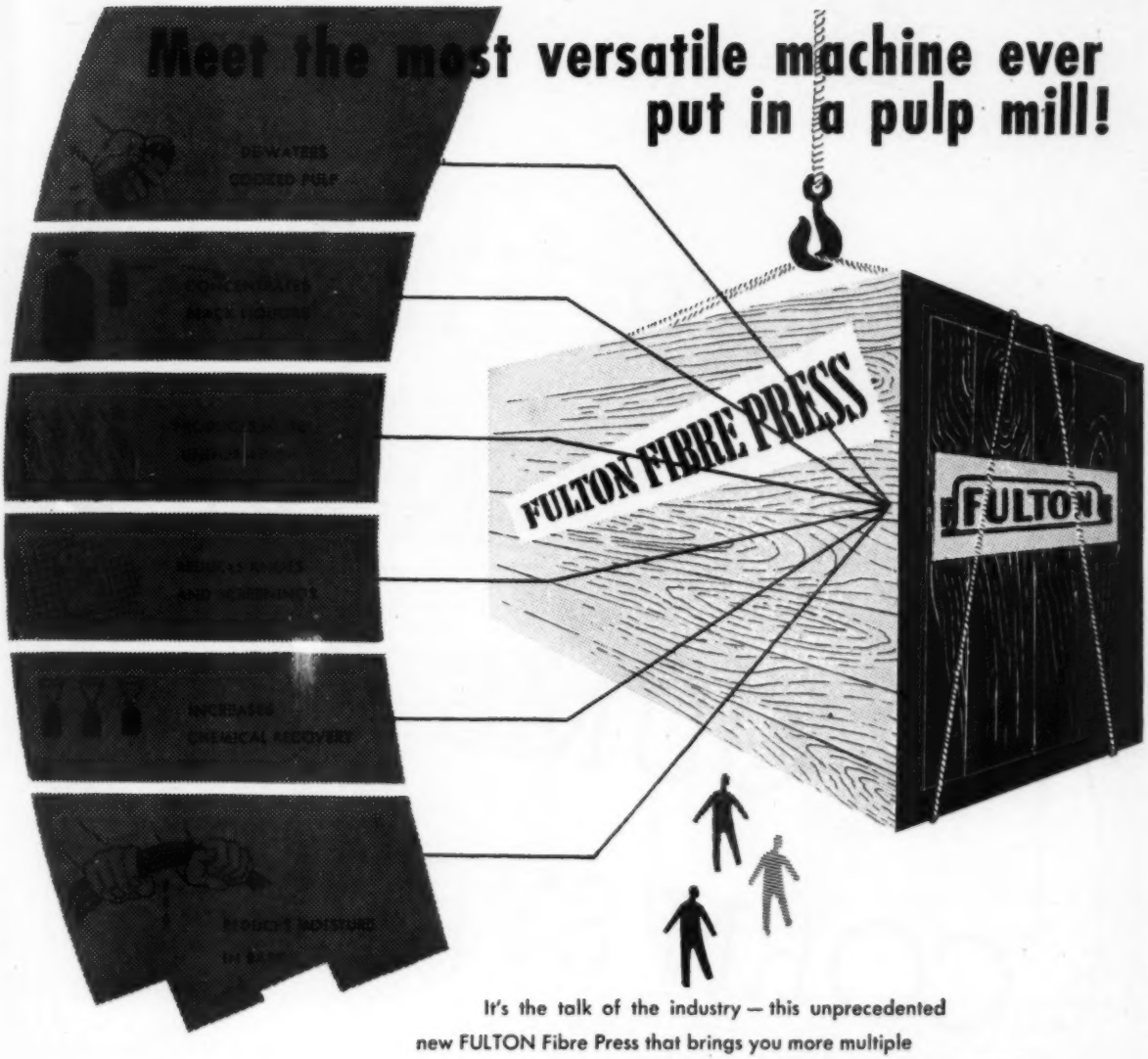
The cross sections at the left show why taper-hardened gears have resilience and life under their hard surfaces—why they last longer in punishing service—why they "roll with the punch". Notice the graduated hardness in the taper-hardened tooth—blending down the scale from maximum hardness at the surface to toughness at the ductile core. Compare it with the thin, brittle, shell-like hardness of the case-hardened tooth in which there is no give, no bend.

No wonder "taper-hardened" BP gear steel makes gears last so long.

For complete information on taper-hardening, write for free copy of "BP Gear Steel" B-4395, Westinghouse Electric Corp., Dept. 79, P. O. Box 868, Pittsburgh, Pa.

J-07276

Meet the most versatile machine ever put in a pulp mill!



It's the talk of the industry — this unprecedented new FULTON Fibre Press that brings you more multiple benefits from *one operation* than anything ever introduced in the long history of pulp-making!

- SAVES LABOR, POWER, HANDLING EQUIPMENT AND WATER
- SPEEDS UP PULP PROCESSING AND INCREASES CAPACITY
- MINIMIZES YOUR STREAM POLLUTION PROBLEM
- PROVIDES CONTINUOUS OPERATION

WANT PROOF? Send us samples of the pulp, bark or screenings you wish to process. We will gladly make test runs on a FULTON Fibre Press at our plant and send you the results — Or, if you prefer, come see for yourself!

For full details phone, wire or write:

FULTON IRON WORKS COMPANY
SAINT LOUIS 14, MISSOURI
New York Office: 82 Wall Street, New York 5

STARCHES
DEXTRINES
GUMS
CORN SYRUPS

Products offered by Anheuser-Busch to the American paper industry have been produced to meet specific industry requirements. Backed by research and practical "know how", their uniform performance and dependable quality have built an enviable reputation throughout the industry. Write us for further information.

Corn Products Department

ANHEUSER-BUSCH, INC.

SAINT LOUIS

OHIO EDISON CO. is one of the many light and power companies throughout the nation that use OIC Valves. Pictured is the Ohio Edison Gorge Power Plant that supplies a portion of the electricity requirements of the Greater Akron area.

OIC

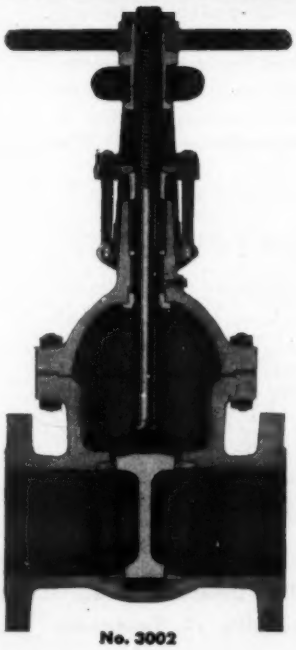
SETS THE PACE IN VALVES

IN THE NATION'S LIGHT AND POWER PLANTS

OIC Valves are the answer to the demands of light and power companies for valves that function with absolute precision and safety for long periods of time. There are good reasons — dozens of pace-setting features that show why OIC Valves are steadily gaining nation-wide preference.

There are no flow obstructions to cause turbulence and pressure drop in OIC Valves. OIC Valves have streamlined, straight-through ports with inner walls as smooth as glass! The heavy I-beam wedge rises entirely clear of the fluid passageway. There are no recesses or pockets between the valve body ports and the seat openings. And OIC Valves are built with rugged strength to withstand the highest pressures. OIC Valves give you extra body-wall thickness . . . precisely calculated flange and gasket dimensions . . . accurate distribution of materials to prevent concentration of stresses in any one part.

OIC Valves save you money by helping you avoid extra pumping. You get *steady* pressure you can depend on! You handle your flow requirements more efficiently — more economically!



No. 3002

Eliminate Change-Over Difficulties with the Handy OIC Cross Reference Chart
Just check the number of the valve that you wish to replace, look in the OIC Cross Reference Chart, and you will find the number of the OIC Valve to replace it. For your free copy, write to *The Ohio Injector Company, Wadsworth, O.*

OIC VALVES

0-549-10

CAST STEEL • FORGED STEEL • IRON • BRONZE

Keeping the Navy "*Ship Shape*" with the Dempster-Dumpster . .

Shipyards, stations, and the men in Uncle Sam's Navy set a standard of cleanliness that is unsurpassed. Helping to maintain this high standard of Navy cleanliness is the Dempster-Dumpster System of materials handling . . . a system of quick pick-up of preloaded containers for hauling, dumping or moving materials.

Exactly 10 years ago the Navy purchased its first Dempster-Dumpster equipment . . . one truck hoisting unit with several containers. Now there are dozens of hoisting units and thousands of Dempster-Dumpster containers of many types at work keeping Navy yards and stations "ship shape." The sturdy steel foolproof and fireproof containers are placed at various places, such as barracks, mess halls, the docks and ship yards, wherever materials (solids or liquids) need be deposited immediately as they accumulate. A Dempster-Dumpster truck hoisting unit quickly picks-up each container when it is filled and hauls it to the disposal area. Contents are automatically dumped and container returned.

If you have a materials handling problem demanding more cleanliness, more economy, and more efficiency, it will pay you to investigate the Dempster-Dumpster System—popularly used, not only by the armed forces, but by municipalities, leading industrial plants, and by large and small institutions of all kinds.

Photo above shows eleven hoisting units recently delivered to the U. S. Navy. Various types of containers are shown in carrying positions. Photo at left shows a hoisting unit preparing to lift a 10 cu. yd. Flat Top container, while another hoisting unit is dumping a 9 cu. yd. Trash and Rubbish Kolector type container. All controls of unit are conveniently located at the driver's seat. One driver and one truck handles any number of containers regardless of types.

DEMPSTER BROTHERS INC.

799 Dempster Bldg.
Knoxville 17, Tennessee

When this big bond paper machine was installed in the plant of the Grays Harbor Pulp & Paper Company, Hoquiam, Washington, in 1929, it was the world's largest and fastest — 202 inches wide, 1,000 feet per minute. All rolls were mounted on Timken tapered roller bearings.

"YES! GO WEST"
TAPPI Fall Meeting
Portland, Oregon
September 11 to 15

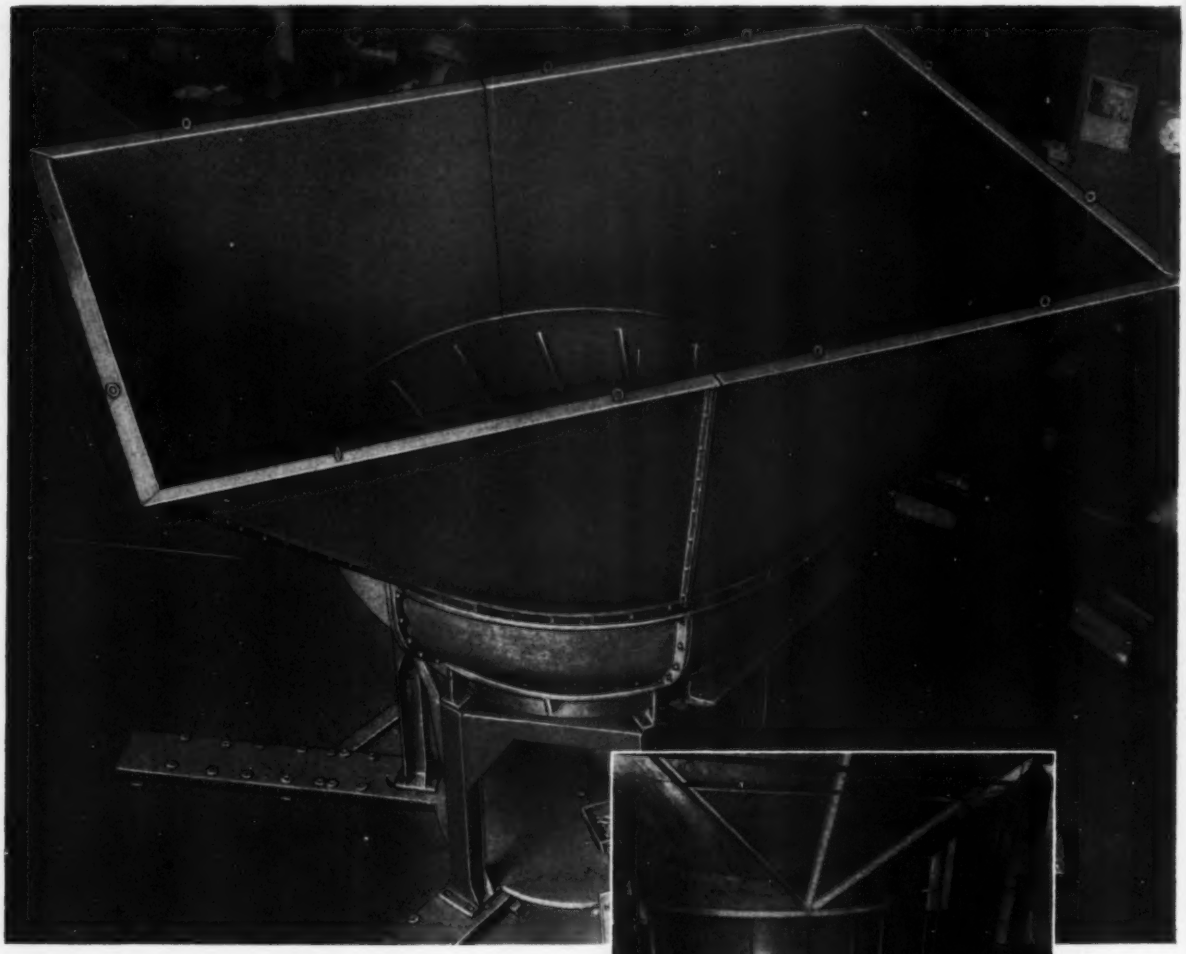
During the ensuing 20 years, Timken bearings have rolled up a very creditable record of performance in this machine. Power is saved; lubrication is simplified; maintenance is reduced; felt life is prolonged.

TIMKEN
TAPERED ROLLER BEARINGS

To be sure of getting Timken bearing service and economy in your machines look for the trade-mark "TIMKEN" on every bearing you use.

THE TIMKEN ROLLER BEARING COMPANY
CANTON 6, OHIO · CABLE ADDRESS "TIMROSCO"

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ↕ AND THRUST →◫← LOADS OR ANY COMBINATION ✳



For a Swiss Installation.

Pacific Northwest Installation

WHAT! NO BROKE?

You're kidding. All mills make broke and have to do something with it and pronto.

Some worry it thru Hollanders. Some drag it off to a distant breaker. The best way is to drop it to a Hydrapulper just below the calenders.

No fuss and less labor. No danger of returning dirty broke to the system.

Hydrapulpers for broke-handling may be standard units or special ones with distinctive broke-handling features. Here shown are a few with flaring tubs, built to special specifications.

A wealth of material on broke-handling available, so let us hear from you.

For a Canadian Installation.

SHARTLE BROS. MACHINE COMPANY
MIDDLETOWN, OHIO

DILTS MACHINE WORKS
FULTON, NEW YORK

KOHLER SYSTEM EQUIPMENT
•
PRODUCT OF DILTS

Divisions of THE BLACK-CLAWSON CO., HAMILTON, OHIO
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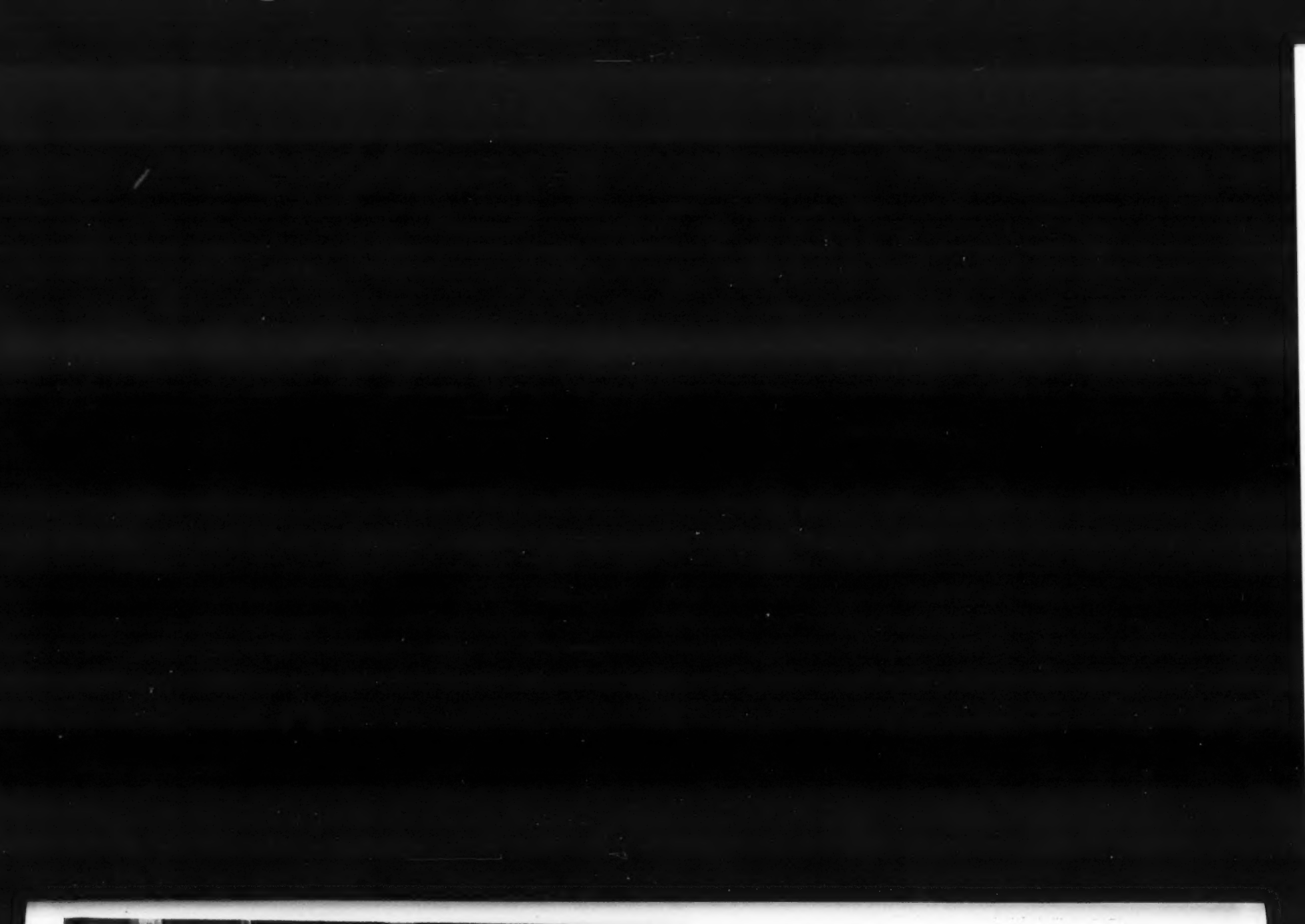
Associate: ALEXANDER FLECK LIMITED, Ottawa, Canada
Subsidiary: B-C International, Ltd., 16 Catherine Place, Victoria, London S.W.1, England



Wanted:

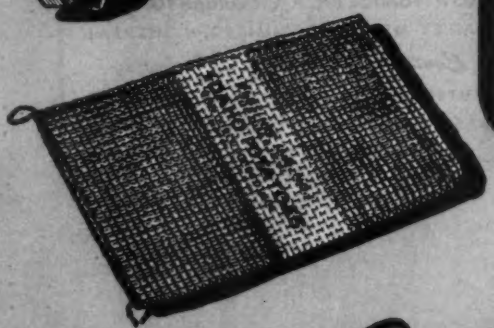
Fastness to water bleeding

Found:

Du Pont Dyes

Pontamine* Fast Yellow BBL Conc. 125%
Pontamine* Fast Orange MRL Conc. 125%
Pontamine* Fast Scarlet 4BS Conc. 150%
Pontamine* Brown D3GN Conc. 125%
Pontamine* Orange R Conc.
Du Pont Purpurine 4B Conc.
Pontamine* Fast Blue 4GL Conc. 150%
Pontamine* Fast Blue RRL Conc. 175%
Pontamine* Deep Blue BH Conc.
Pontamine* Black E Double

Selected Basic Dyes on Unbleached Pulp



Careful selection of these dyes, and at times the use of mordants such as Du Pont Mordant DP and BS will give you specialty papers with colors which will not run or stain other items.

Our Technical Staff is always glad to help you find the right dyes to meet your specific requirements. E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Division, Wilmington 98, Delaware.

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Du Pont Dyestuffs

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That's all it takes! Four basic circuits and 8 basic component parts give you more than 100,000 different electronic instrument combinations for processing use.

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With Bailey controls, replacement part stocks are held to a minimum because parts are interchangeable. Maintenance costs are less, too, because maintenance men quickly become familiar with the standardized Bailey units.

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P-19-A

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ANY SIZE...
ANY SHAPE...
ANY PIPING MATERIAL...
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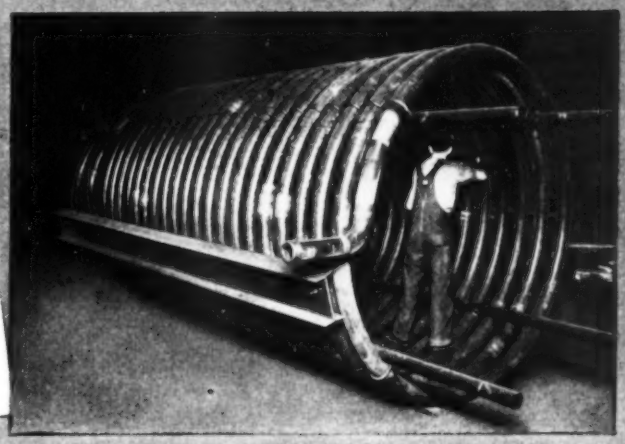
Whatever your pipe coil requirements may be . . . whether carbon steel or alloy . . . Midwest has undoubtedly fabricated similar units. This experience . . . aided by the special coiling equipment developed by Midwest . . . is the reason why many of the most exacting coil users prefer coils by Midwest.

Midwest coils are accurate to dimension, thoroughly pressure tested, stress relieved when necessary, carefully cleaned . . . ready for long, satisfactory service.

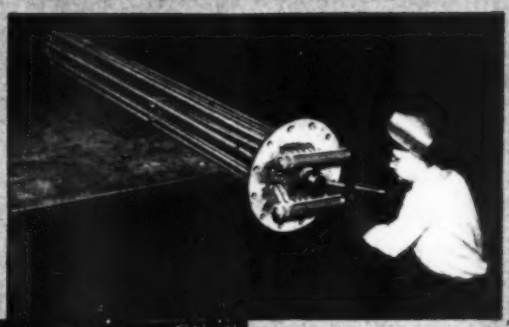
Midwest engineers will gladly assist you in the solution of your pipe coil problems. Get in touch with the nearest office.

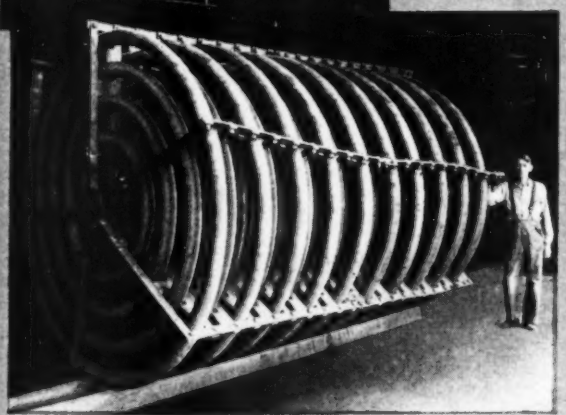


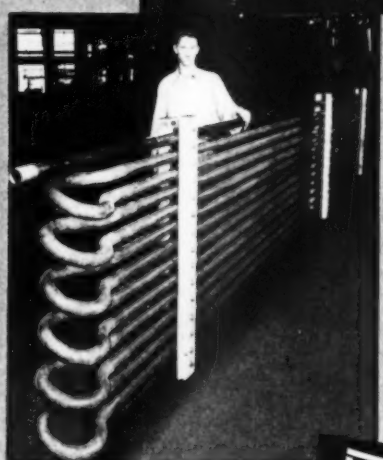
Cylindrical end of polymerization heater coil approximately 8 ft in diameter and containing 850 ft of 4" standard Grade "A" seamless steel pipe.

A nest of box coils containing 850 ft of 2" extra strong seamless pipe, to be used as storage tank heater.

Catalytic reactor coil consisting of 20 flat spirals of 4½" OD x ¼" wall 4-6% chrome, ½% moly seamless pipe. Full-furnace annealing distorted temporary shipping straps.







Nested hairpin coil used as unit heater in 14' diam tank; made from 300 ft of ¾" OD x #14 BWG seamless boiler tubing.

Condenser coil fabricated from 2" OD x ⅜" wall seamless steel pipe. Coil was tested to 7500 psi and is 26 ft long.

MIDWEST PIPING & SUPPLY COMPANY, Inc.

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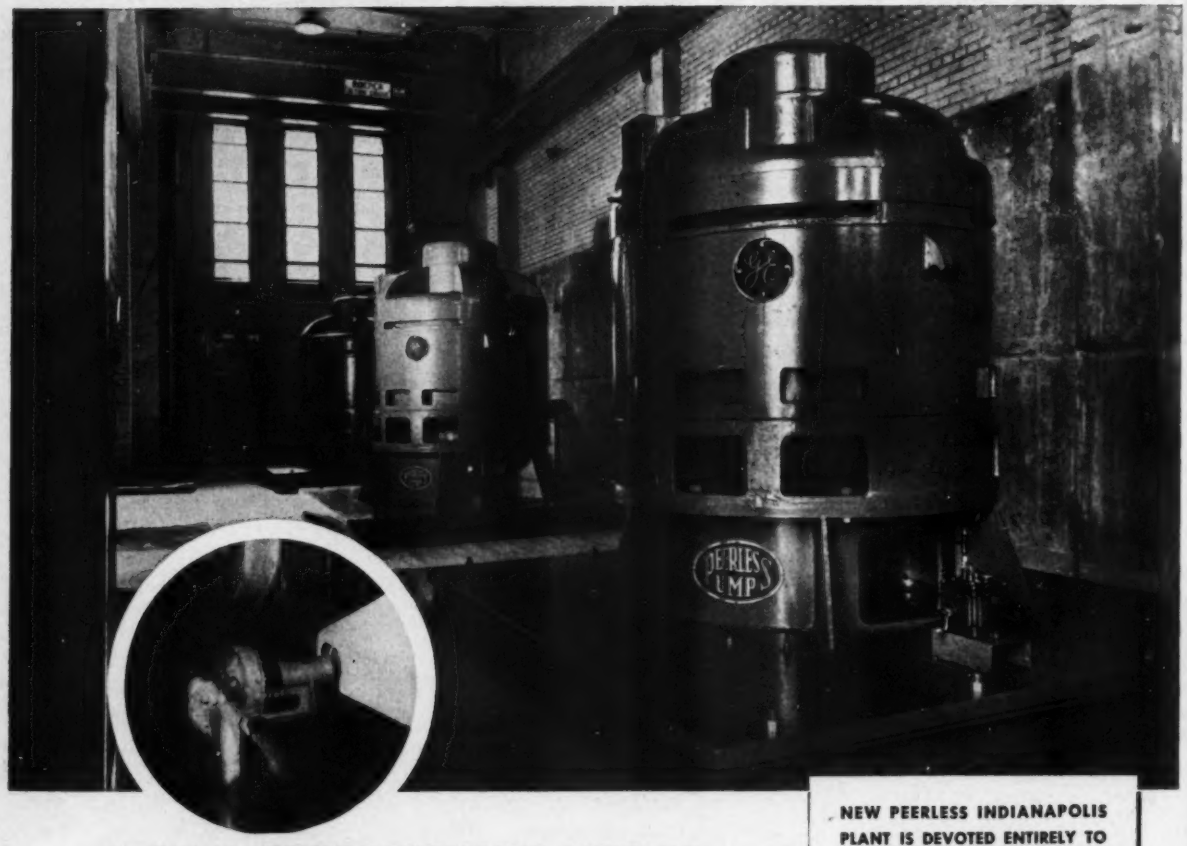
PIPING FABRICATORS AND MANUFACTURERS OF WELDING FITTINGS

WIDEST CAPACITY RANGE



FROM A COMPREHENSIVE LINE OF VERTICAL AND HORIZONTAL PUMPS

Peerless offers 2 to 220,000 gallons per minute

A tapful or a torrent! No matter what your water capacity requirements are, Peerless can meet your pumping needs.

Fractional hp horizontals, like the Peerless "Fluidyne" pumps handling cooling-jacket water in the inset above, furnish a few gallons a minute. The huge Peerless mixed-flow pumps in the larger photo, pump away drainage water at the rate of tens of thousands of gallons a minute.

Widest capacity range is but one of a host of reasons why industries, municipalities and commercial businesses plan with Peerless for all their needs for pumps. Here are others:

ALL PRACTICAL HEADS: Lifting water from 1000 feet or more is a practical accomplishment of Peerless vertical deep well pumps. Pumping against heads of 690 feet is a common task for Peerless horizontal centrifugal pumps.

ALL TYPES OF DRIVE: Electric motor, right angle gear, engine, belt (V or flat) or combinations of the above, are all available from Peerless, with pump and driver engineered as a unit.

MODERN DESIGN: Peerless pumps are designed for top flight performance over extended periods of time. And the practical consideration of ease of maintenance and repair is figured in to their functional, good looking design.

NATIONWIDE SERVICE: Peerless sales and field service is available in all principal U. S. cities and abroad. Plan with Peerless for all your pumping needs. Individual bulletins on all types of Peerless Pumps are available upon request.

NEW PEERLESS INDIANAPOLIS PLANT IS DEVOTED ENTIRELY TO PUMP PRODUCTION AND SERVICE

Here is one of America's newest pump plants—19 acres of modern manufacturing facilities devoted to precision production of horizontal and vertical pumps, centrally located at Indianapolis. Plan with Peerless for pumps plus fast, complete pump service.

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VERTICAL AND HORIZONTAL
Pumps

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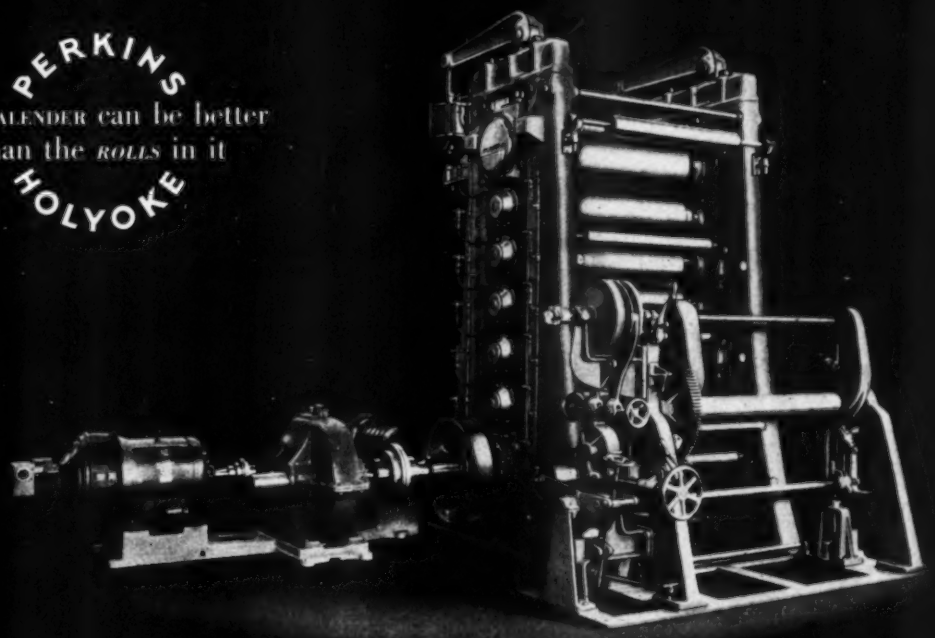
PERKINS
HOLYOKE
No CALENDER can be better
than the *ROLLS* in it



PERKINS

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HOLYOKE, MASS., U.S.A.
LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD

Famous trademarks in paper

• A leader in research, a pioneer in progressive paper merchandising, the S. D. Warren Company was first to develop coated paper for printing purposes, first to manufacture dull-coated paper and first to produce a true India paper in America.

• The Warren Company has established its trademark as one of the most widely recognized and respected symbols in the field of fine printing papers.

...and paper making chemicals

For many years, Wyandotte Chemicals Corporation has made a *business* of supplying chemicals to meet the most exacting requirements of the Paper Industry.

One of these chemicals is Wyandotte Precipitated Calcium Carbonate, a unique paper-coating pigment known for its exceptionally high whiteness, hiding power and smooth texture.

When used in the coating formula, this "tailor-made" product provides the coated sheet with higher brightness and improved printability. It is free of grit and other abrasives, readily and easily dispersible in water and has the uniformity so essential to high-speed machine coating.

Why not get all the facts on this truly fine chemical? Write today for complete information and technical data.

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BICARBONATE OF SODA
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CHLORINE • HYDROGEN • DRY ICE
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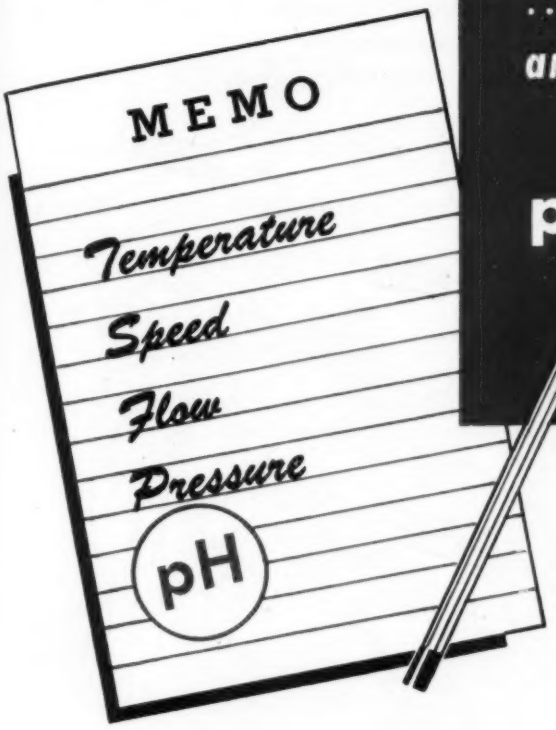
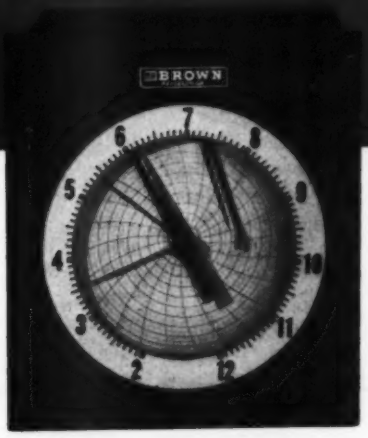
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE
PROPYLENE DICHLORIDE • CHLOROETHERS
AROMATIC SULFONIC ACID DERIVATIVES
OTHER ORGANIC AND INORGANIC CHEMICALS

DON'T OVERLOOK pH

as a cost and quality factor

and don't overlook the *ElectroniK* pH CONTROLLER





With tonnage-versus-cost as a moving target, many mill operators are loading their guns with extra ammunition . . . by providing control for every important variable. In such cases, pH control is gaining recognition as a cost reduction factor, and justly so! It is vital to sheet quality, to the conservation of chemicals and to the useful life of papermaking equipment. Proper control of pH can have startling results!

The sensitivity and speedy response of the *ElectroniK* pH Controller are responsible for the records it is setting in the paper industry. It is particularly valuable in the control of white water pH when used in conjunction with control of stock prior to its entry into the headbox.

Call in your local Honeywell engineer for detailed information . . . or write for a copy of Data Sheet #2.9-33.

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Advanced Instrumentation
FOR THE PAPER INDUSTRY

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For every piping equipment need ... Look to the CRANE line

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A Pulp and Paper Mill Flow System, for example, can be equipped from end to end by this **One Source of Supply**—Crane. And that means simplified piping procedures all along the line ... from design to erection to maintenance work. **One Responsibility** for materials helps to give you better installations, avoids needless delays. **High Quality** in every item from Crane assures dependable piping performance throughout your entire system.

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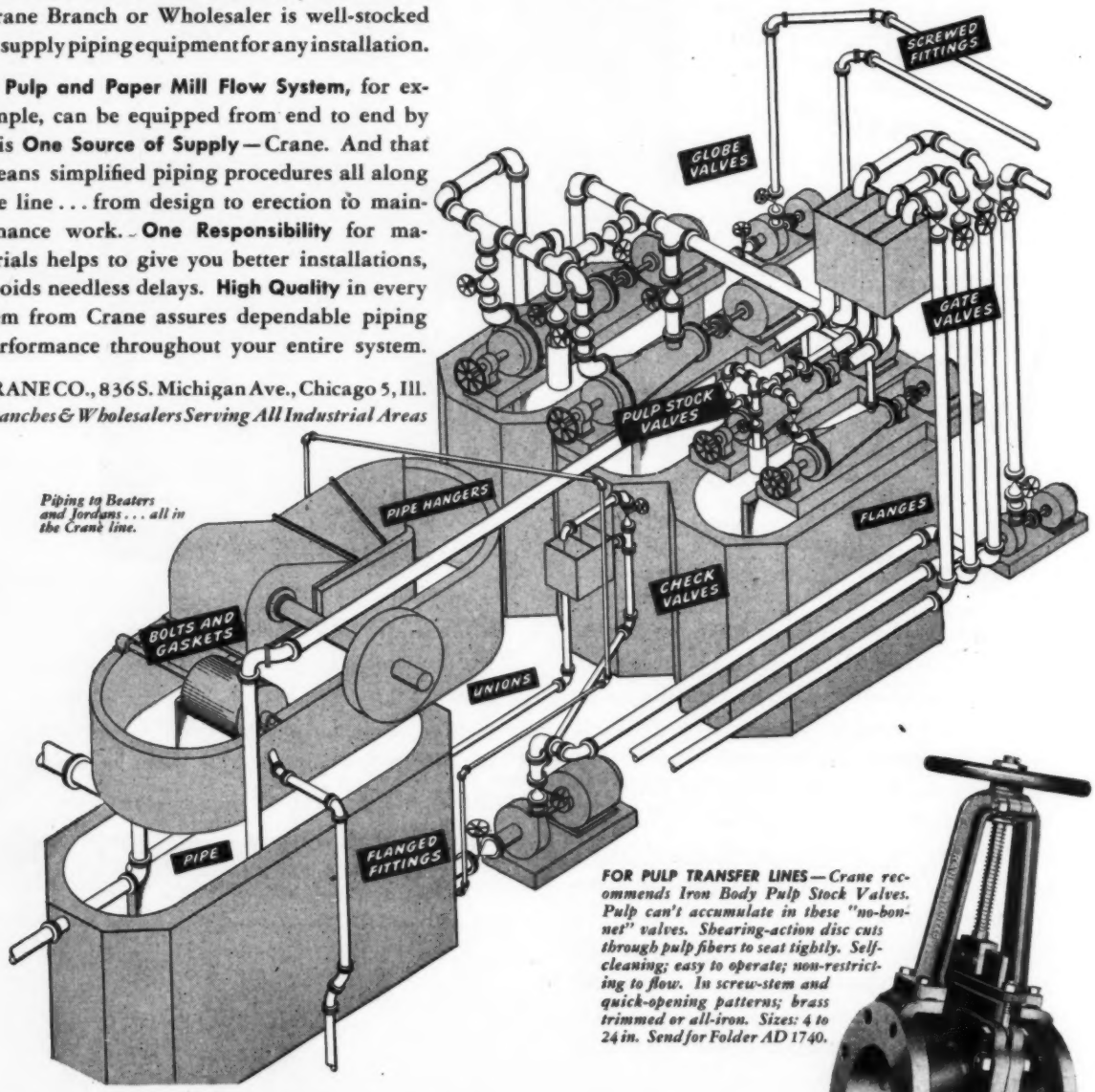

Piping to Beaters and Jordans ... all in the Crane line.

FOR PULP TRANSFER LINES—*Crane recommends Iron Body Pulp Stock Valves. Pulp can't accumulate in these "no-bonnet" valves. Shearing-action disc cuts through pulp fibers to seat tightly. Self-cleaning; easy to operate; non-restricting to flow. In screw-stem and quick-opening patterns; brass trimmed or all-iron. Sizes: 4 to 24 in. Send for Folder AD 1740.*

EVERYTHING FROM ...

VALVES · FITTINGS
PIPE · PLUMBING
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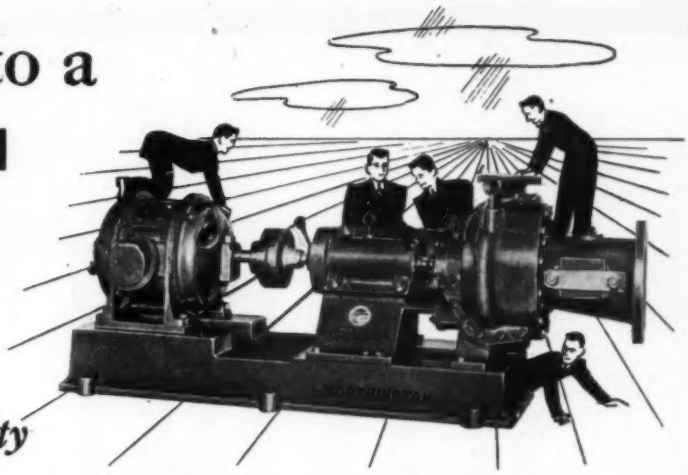
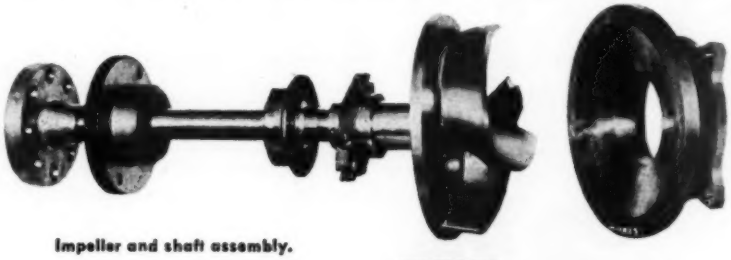
CRANE

FOR EVERY PIPING SYSTEM

Let's look into a WORTHINGTON PAPER STOCK PUMP

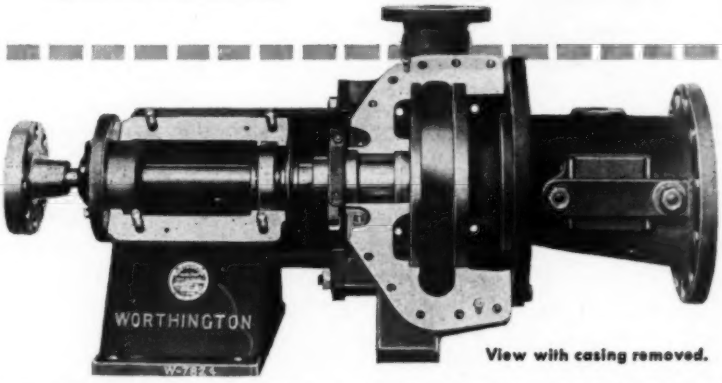
and see what makes it unequalled for dependability





Impeller and shaft assembly.

Fully open impeller prevents clogging. Impeller vanes extend into suction to get stock into pump. Easily replaceable side plates on *both* sides of impeller prevent damage to casing and maintain pumping efficiency. Rugged shaft resists deflection. Extra heavy bearings assure long life.



View with casing removed.

Diagonally split casing for easier servicing, without breaking suction or discharge connections. Eccentric suction cone is extra large size for handling dense stocks.

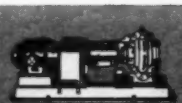
Experience That Stands Alone

Ruggedly built and expertly designed, the paper stock pump illustrated is just one of Worthington's broad range of paper-processing pumps. For maximum dependability and efficiency in *every* pumping application, remember: there is no substitute for Worthington's more than a century of top-ranking experience in the field of hydraulics. Get proof of the *more worth in Worthington*. Call our nearest District Office, or write to *Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.*

WORTHINGTON

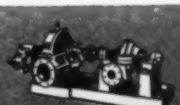
CD-8

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB



CENTRIFUGAL STOCK PUMPS Type FP. Handle all kinds of stock up to 7% consistency. 4 sizes. Capacities up to 6000 GPM; heads up to 200 ft.; speeds up to 1180 RPM.

GENERAL PURPOSE PUMPS Type CP. Open impeller. Single stage. Sizes 1" to 4". Capacities up to 1900 GPM; heads up to 130 ft.; speeds up to 2475 RPM.



BOILER FEED PUMPS Type UG-2. 7 sizes. Capacities up to 1500 GPM; heads up to 1000 ft.; speeds up to 3600 RPM.

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a non-toxic
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THE PAPER INDUSTRY
and PAPER WORLD
SEPTEMBER 1949

Editorial

Have We Stopped Wasting Our Timber Wealth?

▶▶▶ AN OPINION recently expressed by a man who speaks with authority conveys the belief that "the softwood forests of the world are ultimately capable of yielding more wood than has ever been taken in a single year from all forests, both softwood and hardwood."

This startling, though reassuring statement was given out by J. B. D. Harrison, of the Forestry and Forest Products Division, Food and Agricultural Organization, Washington, D.C., in a paper presented before the recent meeting of the Woodlands Section of the Canadian Pulp and Paper Association.

For many generations, back to the days when the first tribes lived in and with the forests, the people of the Americas have accepted wood on the "free list." They have taken forests for granted and depended on wood for their homes and the by-products of wood for countless comforts and conveniences in a way of life handed down by civilization and science. They have never experienced, nor do they expect, a wood famine.

At a meeting just held in Saratoga Springs, New York, by a group of conservationists, which included United Nations delegates studying forestry methods in the United States, it was brought out that this country is behind Europe in conserving its forests, and that South America lags behind the North. Over there, the growing of wood has been treated the same as any agricultural crop.

For a number of years, however, far-sighted men of the wood-using industries in this country have been preaching the gospel of conservation and scientific perpetuity. Several well-organized groups working with these industries have succeeded in winning support of the people in many areas as well as the co-operation of legislative bodies.

One of these groups, the American Pulpwood Association, is this year observing its fifteenth anniversary of service to the pulpwood industry. That Association can now point to an industry which has increased its consumption over 70 per cent. Its aim is to continue serving that industry toward the attainment of more efficient and cheaper methods of logging, better trained woods labor, continuous production, better cutting practices, more trees, and information on and study of all legislation affecting the industry. Through this Association, the pulpwood industry is nationally united in a common endeavor, and is better able to act collectively, yet individually co-ordinated toward maintaining its position in our national economy.

Another organization working closely with the pulpwood industry and its affiliated bodies is the American Forest Products Industries, Inc. This group has made rapid strides in its national program to "Keep America Green." In 1944, there were three states in the Keep Green program and 511,015,000 acres under organized protection. In 1948, the program showed 24 states, with 554,683,000 acres protected, an increase of 43,668,000 acres in four years.

In the state of Wisconsin, Trees for Tomorrow, Inc., is comprised of a group of paper mill executives who are sponsoring a forestry school scholarship program dedicated to future foresters in Wisconsin. This organization also furnishes free seedling trees to farmers, and has been instrumental in establishing memorial forests and private forest holdings within the state.

The protection of our forest wealth may be controlled through organization, but primarily it is a personal responsibility. Forest fires are sometimes the result of natural causes. Beyond that, education in personal caution is the only preventive measure for this irreparable damage. The disastrous fires in the great forests of our nation during the past summer brought a heavy loss in human lives as well as many years of forest growth.

That immortal Kilmer classic seems far removed from the realism just expressed, but our modern approach may justify this parody (authorship uncertain):

A tree that grows through sunny noons
To furnish sporting page cartoons.

A tree whose girth will prove its age
Is ample for a want ad page.

A tree with grace toward heaven rising
Men macerate for advertising.

A tree that lifts its arms, and laughs
To be made into paragraphs.

A tree that falls before the saw—
A five-star final in the raw.

▼

Business Emerging from the Deep Freeze

▶▶▶ BUSINESS HIT BOTTOM with a rebounding bump in July, according to the Federal Reserve Bank's August report of the Industrial Index Number for that month.

For June, the Index Number was 169. For July, it dropped 7 points to 162—two points lower than for December, 1945. Obviously, too low.

In January, the Index Number was 191—so, the drop for the first seven months of this year totaled 29 points, or

Easy as fixing a faucet

THE GRINNELL-SAUNDERS DIAPHRAGM VALVE has only one part that normally wears and needs replacement . . . the diaphragm. Depending on the type of service, it may last for years or only months. It can be replaced in just a few minutes. The valve body doesn't have to be removed from the pipe line . . . only the bonnet. The new diaphragm is attached to the bonnet which is then bolted back onto the valve body . . . and the valve is restored to service. That's all the maintenance a Grinnell-Saunders Diaphragm Valve normally needs. No packing glands to demand frequent attention. No refacing or reseating required, because there are no metal-to-metal seats to become damaged or wire drawn.

SIMPLE, POSITIVE OPERATION . . . Flexible diaphragm opens wide for streamlined flow, pinches tight for positive closure even when grit, scale or other solid matter is trapped on the weir.

NO CLOGGING . . . MINIMUM RESISTANCE TO FLOW . . . Smooth, streamlined fluid passage without pockets prevents accumulation of sludge and reduces friction resistance to a minimum.

NO CORROSION . . . NO CONTAMINATION . . . NO LEAKS . . . The working parts of the valve are completely isolated from the fluid by the diaphragm. Diaphragm materials, body materials and body linings are available to suit service requirements.

Available in various combinations of valve bodies and operating mechanisms. Write for catalog.

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PIPING

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Grinnell Company, Inc., Providence, Rhode Island. Branches: Atlanta • Buffalo • Charlotte • Chicago • Cleveland • Cranston • Fresno • Kansas City • Houston Long Beach • Los Angeles • Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Sacramento • St. Louis • St. Paul • San Francisco • Seattle • Spokane

a decline of over 15 per cent in over-all industrial activity.

It all adds up to this—the decline was much more severe than anticipated and as the August record will show, was wholly unwarranted.

However, during July and August, consumption of commodities and particularly paper products, continued at the maintained heavy volume, at the expense of heavier depletion of excessively depleted inventories.

Too excessive in fact, for since the first week in August, demand turned upward suddenly continuing to gather volume momentum, until at this writing, September 1, the eagerness exhibited by converters, wholesalers, and consumers to lodge orders for tonnages for immediate shipment, approached a scramble.

What is very apparent now is that the seven-month interlude in the placement of orders with the mills, is over for this year. Consumption has caught up with production and overtopped it once again.

There is no denying the fact that business sentiment is better. Growing healthier day by day. Business men are in a happier mood as compared with the gloom which overspread industry during the first seven months operations. The reasons are not hard to find.

The bottom of this year's postwar recession has been struck. A rebound of considerable proportions is already in vogue. The Federal Reserve in its latest report, volunteers the opinion that the Index Number for August will probably be about 166. This is very significant and unusual because the Reserve Board never has indulged in preview predictions.

So, we may look for a rebound to a higher figure. We'll hazard the prediction of 169 for August.

But the happenings at Washington in the past month have been of material influence upon the change to an upward swing for better business. Business has witnessed concrete evidence of the fact that Congress is in stubborn revolt against the fantastic fanfare of the President's increased taxing and spending program.

They saw the abandonment by him of the demand for four billions of increased income taxes. Also, of his demand for a blank check authority to distribute arms and war supplies to any or all peoples who tickled his fancy. They saw half of the arms-to-Europe package tossed out of the window by the thumping majority of 238 to 122 in favor of the tossers—and further, the whole remaining bunch of money demands from us tax payers is undergoing a new model restyling.

But the smashing rebuke given the President was the rejection by the Senate of one of his pet projects—the creation of a welfare department having cabinet status. This went out the window with such abruptness that it left nothing for comment.

Then, Congress, in effect, withdrew rent controls from one-third of the country by reducing funds for policing. So, at the end of August, the people have seen the bulk of his ambitious "mandated" program killed outright, mortally wounded or still withering on the vine.

All this concurrent with the cleanup of the down readjustment completed in July has been sufficient to rekindle the flame of confidence once more in the probable integrity of our free enterprise system. In fact, as support of the administration's panaceas wanes, confidence in the permanence of free enterprise expands. And it will continue to expand as long as Congress consistently repels all dictatorial injection of bureaucratic monopoly into our free enterprise system. For the basis of our healthy, free enterprise system is a nation of busy people freely pursuing their respective businesses.

Expanding confidence in our ability to check a reckless spend-thrift administration is what will underwrite our stabilized free enterprise economy.

▼

The Meeting Season

▶▶▶ SEPTEMBER marks the start of a busy season for those papermakers, technologists, engineers, and executives who believe that participation in association activities is profitable to themselves and to their employers. Most important TAPPI events are the general fall meeting in Portland, Oregon, and the Engineering Conference in Boston, Massachusetts. Traditionally, the Superintendents Association utilizes the autumn months to hold divisional meetings throughout the country. Most of these combine business with pleasure, and provide real incentive to progress.

Not to be forgotten, however, are the many meetings and conferences that do not deal specifically with the paper industry. Their greatest value lies in the fact that they cover many problems common to most industries. Included in this group are the National Safety Council, American Chemical Society, American Society of Chemical Engineers, Instrument Society of America, and the Society of Industrial Packaging and Materials Handling Engineers. Just as important are the various expositions where the latest developments in equipment and techniques are shown, such as the chemical shows in New York and San Francisco, and the the first plant maintenance show in Cleveland. While participation in the TAPPI and Superintendents meetings give men in different mills a chance to swap ideas, attendance at other society meetings gives them an opportunity to learn from other industries.

Too often a false idea of economy influences companies to unduly restrict their men from attending distant meetings, but many others regard the expenses involved in these trips as a sound investment. They believe that a man can't keep up with industrial advances by merely reading the papers presented at such conferences. The events that are not listed on the program such as bull sessions, and off the record discussions are often the ones that prove most valuable and most stimulating. There is no substitute for personal attendance.

SEATLESS MEANS ECONOMY

IN BOILER BLOW-DOWN SERVICE

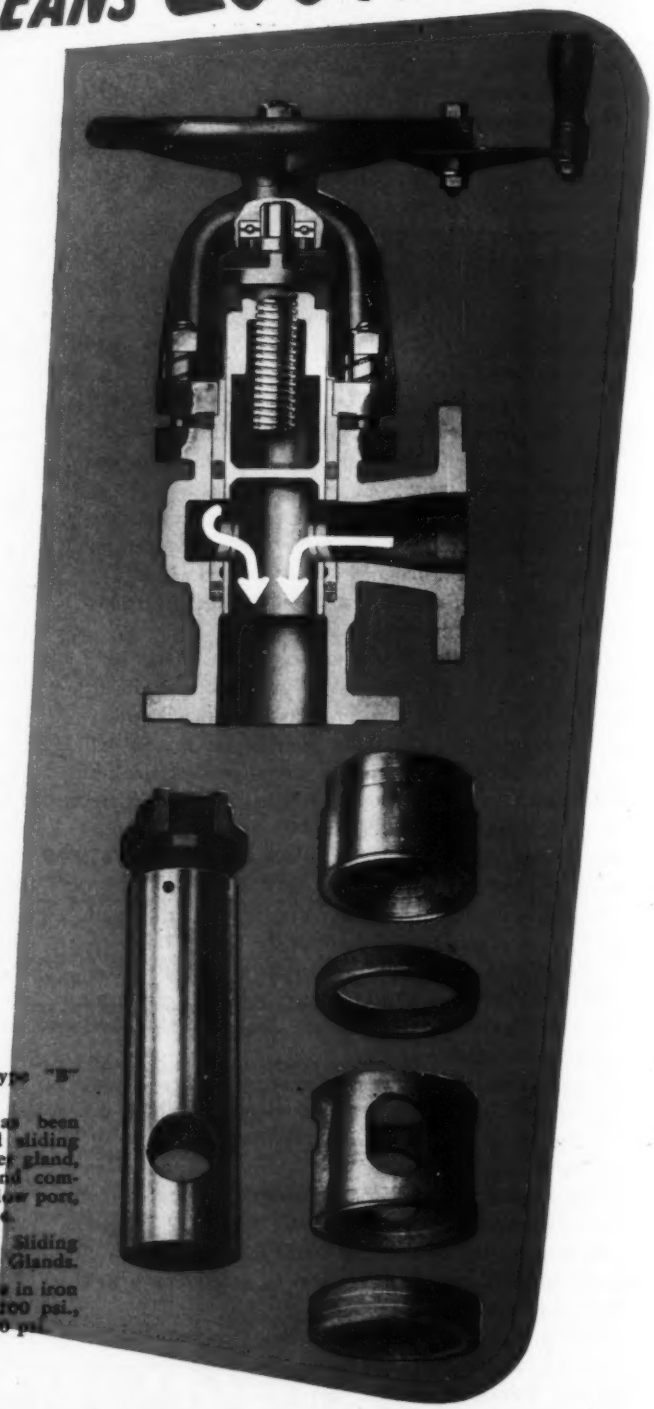
Because they eliminate the commonest source of trouble and expense in ordinary blow-off valve service, Yarway *Seatless* Blow-Off Valves mean real economy to boiler plant operators. *Yarways have no seat to score, wear, clog and leak.* Lubrication is usually the only maintenance they require.

Yarway introduced the seatless principle with the balanced sliding plunger many years ago . . . has constantly improved and adapted it to meet modern service requirements. Mechanical and metallurgical research in Yarway's own Steam Laboratory anticipates changing conditions . . . keeps Yarway valve design ahead.

There is a Yarway Blow-Off Valve for every pressure.

SEND FOR FREE BLOW-OFF VALVE BOOKLET. PLEASE INDICATE THE PRESSURE OF YOUR BOILERS.

YARNALL-WARING COMPANY
149 Mermaid Avenue, Philadelphia 18, Pa.



(*Above*)—Cross section of Type "B" Seatless Angle Valve, flanged.

OPERATION: After valve has been closed, shoulder on balanced sliding plunger contacts upper follower gland, forcing it down into body and compressing packing above and below port, making an absolutely tight valve.

(*Below*)—Type "B" Balanced Sliding Plunger, Packing Rings and Glands.

Yarway Type "B" Valve is made in iron for blow-off pressures up to 200 psi., and in steel for pressures to 400 psi.

YARWAY BLOW-OFF VALVES

Current Comment . . .

The opinions expressed here are from a commentator close to the industry, who, in the past, has interpreted briefly the trends of the paper industry. His comments, which hereafter will appear at greater length than before, and in broader scope, are based entirely on economic and financial facts that emanate regularly from sources that speak with authority.

Stronger Trend Indicates Recession Climax Has Passed

Low Inventories Should Increase Paper Demand

▶▶▶ Earlier estimates that the business recession had reached its peak in the first months of the year appear to have been justified by developments in the paper field during recent weeks. The trend is definitely stronger for the industry as a whole, although the weakness in the coarse paper field has continued. This appears to be true particularly in the bag field, where consumers have not yet worked off their large inventories. Efforts to secure price concessions from the mills, however, have been generally futile, only a few weak sisters succumbing to the lure of volume at the expense of profits. The pulp situation has been strong, with Scandinavian deliveries continuing below the levels of other years.

While the manufacturers are looking toward a better condition in the fall, with reports that consumer inventories are at an all time low, merchants are making a more or less ineffectual drive to secure concessions for spot purchases. With the end of the wholesale vacation period of July, production is stepping up again, but it is still below estimated consumption. While July output was down to about 72 per cent of capacity, August saw a sharp upturn, reaching nearly 90 per cent of capacity in the last part of August. Paperboard output was close to the ratio in the paper field. The fact that July output was the lowest since Pearl Harbor should not be taken as an index of true business conditions in the industry, for the mass vacation factor was largely responsible for this condition. The average for July and August justified a belief in the basic solidity of the industry.

Today the paper industry's financial background is stronger than ever in its history; the fluctuations in prices experienced in other years have not been experienced this year, and presumably will not be felt, except in scattered instances.

Ask ECA for Help to Protect Domestic Pulp Producers

At Washington, Congressman Russell V. Mack of Washington, in a speech before the House of Representatives, demanded greater protection for the domestic pulp producing industry. He said that a decrease in pulp exports had resulted in a drop of 80 per cent from the prewar period and that there was a resultant loss to domestic investment and labor. Particularly he demanded that the ECA require foreign nations to cease their discrimination against this country in the purchases of pulp, saying that foreign labor is 50 cents per hour as against $1.50 in this country.

The Administration's program for the rehabilitation of Europe will be discussed in detail at an early date. Conferences looking toward a possible change in the valuation of foreign currencies already have begun, but the final outcome is in doubt. This country is strongly in favor of a devaluation of the British pound and an accompanying devaluation of other currencies in the sterling area, with the hope that such devaluation will enable Europe to sell larger quantities of its products in this market. On the other hand, Great Britain has not looked on the proposal with friendly eyes. Whether American pressure will result in a British retreat remains to be determined.

Meanwhile, it is reported that the United States will modify its position on British trade requirements, under which the United Kingdom was expected to ease its restrictions on American imports as part of the provision for the heavy loan made Great Britain by this country. These reports are that this country will allow Britain to impose more rigid restrictions on imports of American goods.

The Finnish situation has been complicated further by an effort of the Communists to take over that country by strikes in the wood producing industries. Meanwhile, this country has granted Finland an additional loan for the rehabilitation of its wood using industries, including paper and pulp. In short, this country is continuing its policy of financing the enlargement and improvement of the Finnish mills, to enable them to sell more advantageously in the American market. This expenditure of American taxpayers' money to increase the competition with American mills, which are paying the freight, is justified by the feeling at Washington that at all hazards to American business Finland must be kept out of the clutches of Russia.

Committees Face Opposite Views on Two Questions

Other Washington developments include the approval by a Senate Committee of the appointment of John Carson as a Federal Trade Commissioner. Four members of the committee voted in opposition, basing their action on the feeling that Mr. Carson is hostile to business as such, and particularly to large scale industries. The question of how to legalize basing point prices has reached a conference committee of the House and Senate, which will endeavor to reconcile opposing views of the proposal to overcome by legislation the action under which basing point pricing has been held by administrative agencies to be a form of price fixing.

FINANCIAL

▶▶▶ A GENERAL UPWARD movement in the securities markets resulted in general advances in the quoted prices for paper mill securities during August. After a prolonged drop in average quotations, the tide turned early in August, but was halted, temporarily at least, after a day-by-day advance for several weeks. As soon as the advance was halted, however, sales of paper mill securities dropped off, holders being apparently willing to wait for further advances, and being unwilling to dispose of holdings purchased at lower prices.

APW Products Company—Net loss for the first six months of 1949 was $146,320 as compared with net profit of $149,046 in the comparable period a year ago.

American Writing Paper Company—Net loss for the first half of 1949 was $30,000 as compared with a net loss of $32,020 in the first half of 1948.

Certain-teed Products Corporation—Net income for six months ended June 30 was $1,897,142 as compared with $3,186,968 a year ago.

Continental Diamond Company—Net income for six months ended June 30 was $292,205 as compared with $445,667 a year ago.

Eastern Corporation—Net income for six months ended June 30 was $63,682 as compared with $1,257,344 a year ago.

Robert Gair Company—Net income for six months ended June 30 was $1,859,985 as against $2,862,910 a year ago.

Great Northern Paper Company—Net income for six months ended June 30 was $2,851,845 as compared with $2,165,012 a year ago.

Hammermill Paper Company—Net income for six months ended June 30 was $334,092 as compared with $830,901 a year ago.

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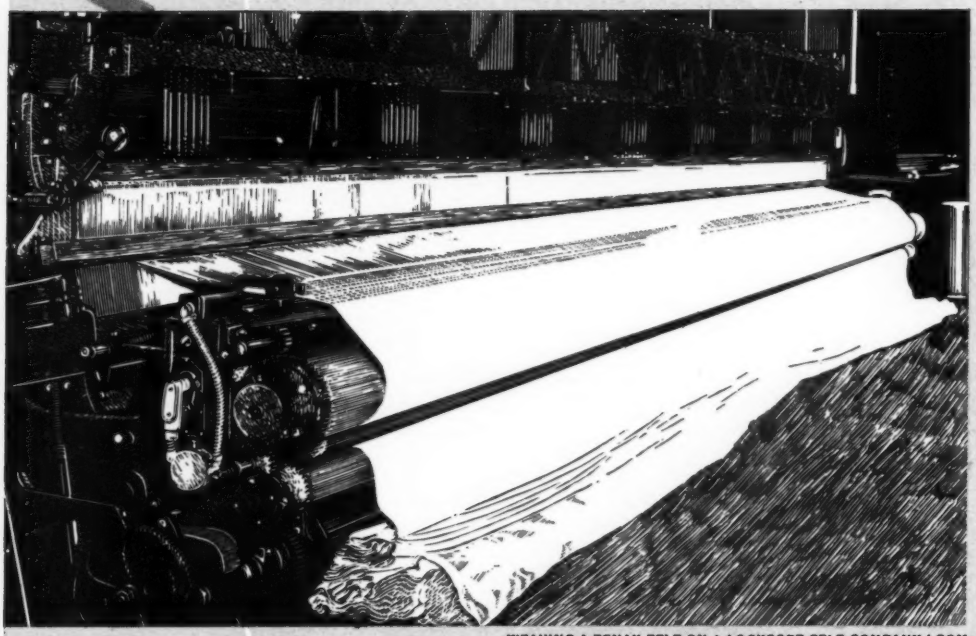
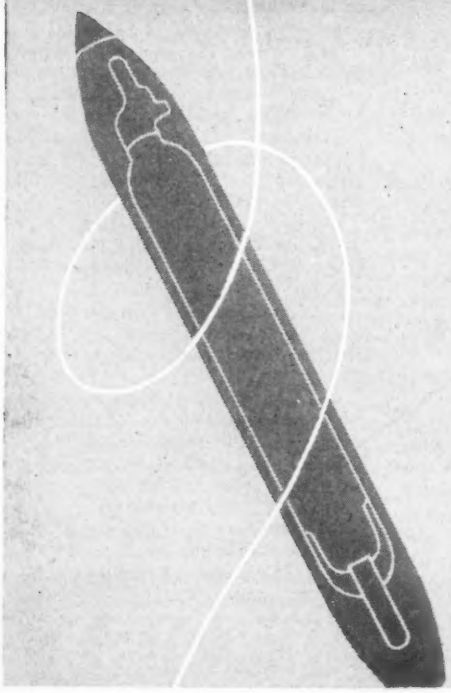


WEAVING A TENAX FELT ON A LOCKPORT FELT COMPANY LOOM



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The Lockport representative in your territory is fully qualified to advise on all technical questions relating to felts. He is at your service as is our plant and all its people. We invite your inquiries.

LOCKPORT FELT COMPANY · NEWFANE, NEW YORK

Hinde & Dauch Paper Company—Net income for the six months ended June 30 was $1,308,174 as compared with $2,186,482 a year ago.

International Paper Company—Net profit for six months ended June 30 was $24,649,329 as compared with $28,556,437 for the first half of 1948.

Kimberly-Clark Corporation—Net income for six months ended June 30 was $3,432,944 as compared with $4,087,916 for the same period a year ago.

National Container Company—Net income for six months ended June 30 was $1,138,605 as compared with $3,584,111 a year ago.

Puget Sound Pulp & Timber Company—Net income for six months ended June 30 was $867,142 as compared with $3,213,642 a year ago.

Rayonier, Inc.—Net income for six months ended June 30 was $3,482,931 as compared with $5,012,251 a year ago.

Scott Paper Company—Net income for six months ended June 30 was $2,519,542 as compared with $1,743,592 for the first half of 1948.

Southern Advance Bag & Paper Company—Net earnings for six months ended June 30 were $1,031,923 as compared with $2,034,622 a year ago.

Union Bag & Paper Corporation—Net income for six months ended June 30 was $3,258,016 as compared with $7,273,367 for same period of 1948.

S. D. Warren Company—Net income for six months ended June 30 was $825,925 as compared with $1,117,835 a year ago.

West Virginia Pulp and Paper Company—Net income for nine months ended July 31 was $6,522,713 as compared with $6,894,659 in the same period of 1948.

New York Stock Exchange—Stocks

	Closing Prices August 25	July 25
A.P.W. Products	*2⅝-3	*2⅝-3
Celotex	15⅞	16⅛
Same Preferred	*16¼-17⅛	*15⅝-16¼
Certain-teed Products	12	11⅞
Champion P. & F. Co.	*23⅝-24	22⅞
Same Preferred	*96-97⅝	92½
Chesapeake Corp.	*18⅜-19	18⅛
Container Corp.	35	35
Same Preferred	*99-100	96
Continental Diamond	7¼	*6¾-7¼
Crown Zellerbach	25⅛	24⅝
Same Preferred	*99¾-101⅛	98⅜
Same $4 Preferred	94	*93-95½
Dixie Vortex	*28⅝-29	26⅜
Same "A"	——	47½
Eastern Corp.	8¼	8½
Robert Gair	6	5⅝
Same Preferred	17	16
Gaylord Container	19	18¼
International Paper	54⅛	49¼
Same Preferred	103	96½
Kimberly Clark	21⅝	19⅜
Same Preferred	*100-103	*91-93½
McAndrews & Forbes	*33½-34¼	33
Marathon	20	*20-20¼
Masonite	47⅜	45⅞
Mead Corp.	12⅝	12¼
Same Preferred	*86-95	76½
Same 2nd Preferred	*31-33	*32½-34
National Container	6⅜	5⅜
Paraffine Cos.	*18½-19	17⅜
Same Preferred	*102¼-103½	*102¼-103¼
Rayonier Inc.	24⅛	*24⅞-25⅛
Same Preferred	*31-31⅝	*29⅞-30
Scott Paper	59	*55¼-55⅞
Same $3.40 Preferred	96	*94-94½
Same $4 Preferred	*105¼-106¼	103⅞
St. Regis	6⅝	6⅝
Same Preferred	*81-82	*78-79
Sutherland Paper	*32½-33⅝	*32-32⅝
Union Bag & Paper	24	22½
United Board & Carton	*5⅝-6⅛	5
United Wall Paper	——	3⅜
Same Preferred	*23½-25	*22⅝-24
U. S. Gypsum	94	*98¾-99¾
Same Preferred	*182-184	*176¼-178
West Va. P. & P.	40⅝	40
Same Preferred	107	*106-107½

New York Stock Exchange—Bonds

A. P. W. Products 3⅝	*69-70	70
Celotex 3⅝%	160¼	160¼
Champion P. & P. 3⅝	*102½-103½	*101½-102
Mead Corp. 3⅝	102	102

New York Curb Exchange—Stocks

Am Writing	*5⅞-6	*5⅝-5⅞
Great Northern	38⅝	36⅜

*Closing Bid and Asked Prices

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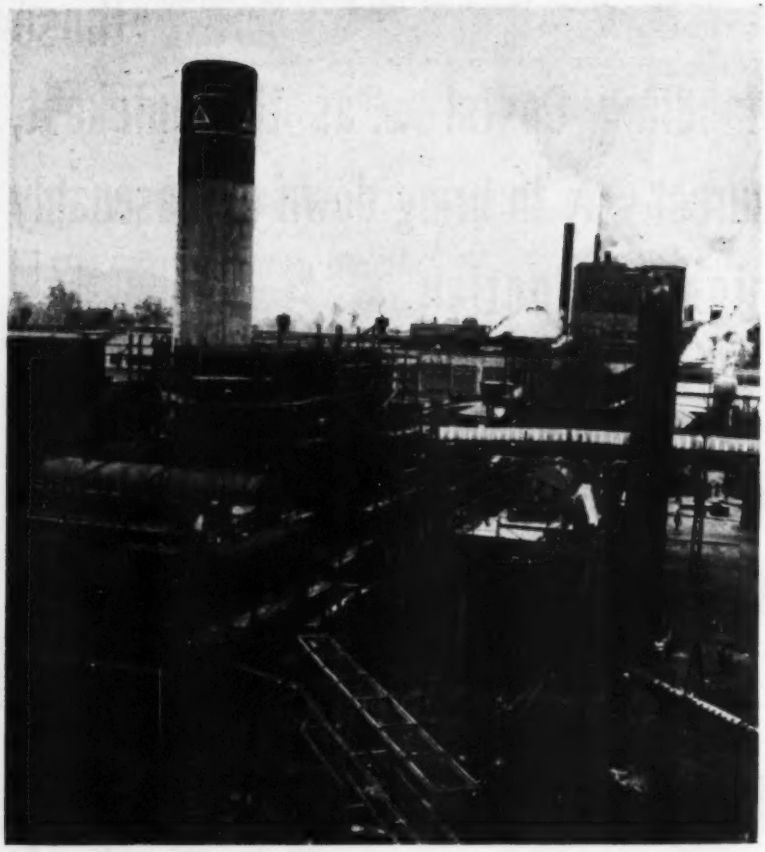

Construction scene of new steam and electric generation plant of Longview Fibre. Co.

New Steam and Electric Plant at Longview Fibre in Operation

▶▶▶ WITH PARTIAL service established, the new high pressure steam and electric plant of the Longview Fibre Company, Longview, Washington, went into operation recently. Costing upwards of $3,000,000, the plant was built to retire less efficient equipment, provide for future growth, and permit the company to be independent of outside sources for steam and electricity, if necessary.

Three boilers and two turbogenerators have been installed. The boilers are designed for 900 lb psi pressure and 750 Fahr temperature. The three boilers have a total capacity of 560,000 lb of steam per day. One of the three is a chemical recovery unit; it operates on waste liquors from the pulp cooking, and recovers both heat and useful chemicals. At the same time, it eliminates stream pollution. The two direct-fired boilers are equipped to burn oil, and one is equipped for hog fuel. Storage is provided for 20,000 units of hog fuel.

The two turbines have a capacity of 16,000 kw. They take the steam at high pressure and deliver it at a lower pressure for mill usage, producing electricity in the process.

The plant was designed by R. P. Wollenburg and V. M. Sutherling of the Longview Fibre Company's engineering division. R. C. Powell, of San Francisco, was the consulting engineer.

▼

"QUICK-TIES" MADE OF RESINIZED PAPER TWINE

Formation of a Garden Products Division of the Portco Corporation, Portland, Oregon, at the company's Vancouver, Washington, plant was announced by the company's vice president, G. Ralph Meyer.

Operation of the Garden Products Division will be conducted in the company's new paper products plant at Vancouver. Production has started on the first garden item, Portco Quick-ties, which are designed to fasten vines, shrubs, and all types of plants in a quick and easy manner.

Quick-ties are round strips 8 in long made of a wire center and covered with a resinized twisted paper twine. Mr. Meyer stated that the company has been engaged in research for several years in order to secure a garden twine that would resist moisture and general weather conditions. It is claimed that the specially treated Portco Quick-tie is a solution to the problem.

Much of the trim from the Northwestern paper mills will be utilized in the manufacture of these Quick-ties. The company has had 20 years experience in manufacturing paper twine of all types.

Quick-ties will be introduced nationally and will have full support of an extensive advertising promotion program. Other garden products being developed by the Vancouver plant will be announced in the near future.

▼

MAC MILLAN CO.'S SULPHATE PULP MILL ON VANCOUVER ISLAND NEARING COMPLETION

Construction is now well advanced on the new pulp mill project on Vancouver Island, British Columbia, Canada, of H. R. MacMillan Export Company, Ltd.'s wholly-owned subsidiary, Nanaimo Sulphate Pulp, Ltd. Practically all of the concrete foundation for steel reinforced structures have been completed, and four digesters have been placed in position. About 600 men are employed on the work.

Situated on Northumberland Sound near Nanaimo, the $17,000,000 project is scheduled for completion in mid-1950. It will employ regularly more than 200. (Cf. P.I. and P.W., Mar., 1948, p. 1712.)

▼

CLOSE OF SULPHITE PULP MILL IS ANTICIPATED BY BOWATERS

The Newfoundland Federation of Labor has been informed recently that Bowaters Paper Mills, Corner Brook, Newfoundland, may be forced to close down its sulphite mill at the end of this year.

H. M. S. Lewis, vice president and general manager of the company, said that dollar difficulties had practically wiped out the British market for the company's sulphite pulp production, while another contributing factor had been the recent price decline of $25 per ton.

The outlook for newsprint is fair, and no cut is foreseen in the firm's newsprint production, but all connected with the industry are being urged to help increase efficiency and cut costs to enable the firm to maintain sales in a highly competitive market.

Thirty-Sixth Conference With Hammermill Agents

▶▶▶ HOW the Hammermill Paper Company and its merchant distributors can work together to restore profit margins to an equitable level—was the major topic at the Thirty-Sixth Conference with Hammermill Agents. The Conference was held at Erie, Pennsylvania; August 24th, 25th, and 26th. Paper merchants from all over the United States attended the meeting; the 186 attendance figure being one of the highest for any of the thirty-six conferences.

As in the past, the spirit of friendship and business co-operation existing between Hammermill and its agents was an outstanding feature of the 1949 meeting. Referring to this as he welcomed the agents at the opening business session, Norman W. Wilson, Hammermill president, stated: "In calling to order this Thirty-Sixth Conference, from all of Hammermill I extend a handclasp of welcome to you, our guests. That handclasp is warm, sincere and confident. This wide representation of merchants from all over the country makes joint, efficient action possible."

Following Mr. Wilson, Donald S. Leslie, Hammermill's first vice president and general manager, spoke in detail about the company's present manufacturing facilities and position in the market. In the former group are included important mill improvements which have been made since the conclusion of Hammermill's $8,500,000 postwar expansion program.

Bruce Barton, well known author and chairman of the board in the firm of Batten, Barton, Durstine and Osborn, Inc., Hammermill's advertising counselors, was a guest speaker at the August 25 meeting. During his humorous and informal talk, Mr. Barton spoke of the serious need for making our economic system work and thus keeping it strong. Mr. Barton stated that it would be more apt to term our economic system one of "hustle and hope" than one of "private enterprise." That the growth and prosperity of the United States has resulted from "millions and millions of boys who have been given the freedom to hustle and the right hope."

Attending the conference with Mr. Barton was Alex D. Osborn, vice chairman of the board of Batten, Barton, Durstine and Osborn, Inc. Mr. Osborn wrote the recent best seller in the nonfiction field entitled *Your Creative Power*, and has been a business partner of Mr. Barton from the founding of the advertising agency they head.

Other Hammermill spokesmen at the August 25 meeting were John D. Zink, vice president and director of merchandising; Grant Richardson, manager of sales, and Mortimer E. Graham, company secretary. Mr. Zink reviewed the recent, present and expected future condition of the fine paper market and the position of Hammermill and Hammermill Agents with respect to these topics. Mr. Richardson discussed the present qualities and sales opportunities of the various Hammermill lines while Mr. Graham reviewed the meaning of recent legal decisions with regard to delivered prices and suggested resale prices.

Prior to the general business sessions, members of the Agents' Advisory Committee met with mill officials on August

Trees for Tomorrow Board Enjoy Summer Meeting at Camp

AT ITS CAMP in Eagle River, Wis., the Board of Directors of Trees for Tomorrow held the regular summer meeting and discussed such vital subjects as: Tree planting prospects for 1950; forestry scholarships and operation of the Eagle River Camp; and co-operation with small forest land owners in preparation of forest management plans. The directors are shown here grouped before a mural in the new forest products exhibit building at the Camp.

SEATED (L to R): E. G. Ingalls (vice pres., Wausau Paper Mills Co., Brokaw); D. B. Smith (pres., Ward Paper Co., Merrill); D. C. Everest (pres., Marathon Corp., Rothschild); Folke Becker and Robert Caldwell (pres. and vice pres. respectively, Rhinelander Paper Co., Rhinelander); E. B. Hurst (head of Woodlands Div., Consolidated Water P. and P. Co., Wisconsin Rapids)

STANDING: C. G. McLaren (vice pres., National Container Corp. of Wis., Tomahawk); E. E. Zahn (Woodlands Div., Marathon Corp., Rothschild; N. S. Stone (vice pres., Mosinee Paper Mills Co.); M. N. Taylor, executive director, Trees for Tomorrow, Merrill; C. E. Kohlhepp (pres., Wis. Public Service Corp.); E. Emerson (Woodlands Div., Mosinee Paper Mills); W. A. Sylvester, forester, Trees for Tomorrow. Other directors are: Stanton W. Mead (vice pres., Consolidated Water P. and P. Co.); Leonard Kuehl (vice pres., Kansas City Star Co., Flambeau Paper Div.); and K. S. Dickinson (pres., Tomahawk Pulp Co.)

24 at Weigela Lodge, Mr. Wilson's country home, for a discussion of the conference program. Committee members present were: Eric A. Rohrer, Swigart Paper Company, Chicago, Illinois, chairman; L. V. Mulnix, Carpenter Paper Company, Grand Rapids, Michigan; Frank H. Winter, Carter, Rice and Company, Boston, Massachusetts; Hugh G. Boyer, Caskie Paper Company, Inc., Charlotte, North Carolina; C. W. Stuyvesant, The Alling & Cory Company, New York, New York; C. S. Lafferty, Beacon Paper Company, St. Louis, Missouri; C. H. Williams, Clements Paper Company, Nashville, Tennessee; C. R. Smith, Garrett-Buchanan Company, Reading, Pennsylvania; Victor E. Hecht, Zellerbach Paper Company, San Francisco, California.

The assembled Agents elected these men to serve three-year terms on the Advisory Committee: Paul M. Jones, Storrs & Bement Company, Boston, Massachusetts; E. J. Petrequin, Petrequin Paper Company, Cleveland, Ohio; L. A. Ramaker, The Bouer Paper Company, Milwaukee, Wisconsin. C. W. Stuyvesant, The Alling & Cory Company, New York, New York, was elected chairman for the coming year.

Elected for three-year terms on the Paper Committee were: T. H. Epes, Jr., Epes-Fitzgerald Paper Company, Inc., Richmond, Virginia; H. J. Foulds, The Alling & Cory Company, Cleveland; Frank P. Leslie, Jr., The John Leslie Paper Company, Minneapolis, Minnesota. Carl J. Rusie, Crescent Paper Company, Indianapolis, Indiana, was elected to fill the unexpired term of a former committee member.

The final afternoon of the Conference was devoted to golf and other games. In this competition Frank P. Leslie, The John Leslie Paper Company, Minneapolis, Minnesota, won the Ernst R. Behrend Golf Trophy to take possession of the silver bowl for the coming year.

▼

P&P SCHOOL AT KALAMAZOO PRESENTED WITH A SHEET MACHINE BY NOBLE & WOOD

A complete sheet machine has been presented by the Noble and Wood Machine Company, Hoosick Falls, New York, to the new Pulp and Paper Technology School of Western Michigan College, at Kalamazoo, Michigan. The machine is new and is valued at $3,200. Presentation was made recently by Noble and Wood's midwestern representative, C. B. ("Baldy") Smith.

The machine is a model common to paper mill laboratories throughout the country; it is used for testing pulp and making 8 x 8 hand sheets.

Lab-size Pulp and Paper Mill Under Construction at Provincial PM School

▶▶▶ A SMALL, INTEGRATED pulp and paper mill is being constructed at the Provincial Paper Making School, Three Rivers, Quebec, with the finishing date set for late this year. Training courses in pulp and paper, which have been held in these classrooms and laboratories for more than 20 years, thus will be in step with the development of the modern paper mill.

The capacity of the small plant is about three tons of newsprint per day. However, all grades of pulp, such as semichemical, sulphite and sulphate, as well as all grades of paper, such as board, newsprint, and tissue also can be made. Materials used in these machines are chosen for long life and easy cleaning. There also is a minimum of brass rail, for economy.

Typical unit processes containing all elements of commercial equipment are represented. There will be a chemical pulp mill, a groundwood pulp mill, a pulp screening and washing section, stock preparation section, a complete paper machine and a paper finishing section.

All the unit processes are tied together by stock pumps and a stock pipe header to nine agitated tile stock chests. Units operate separately for tests or in series as an integrated mill. A low pressure oil-fired boiler and a high pressure electric generator produce steam for all the mill. Facilities are provided for handling and storing materials and for servicing and manufacturing equipment.

A variety of mechanical, electrical and other devices, used by papermakers, comprise the unit pulp and papermaking processes. Control and recording instruments are used extensively. Variable speed mechanisms include a d-c motor, a commutator motor with induction transformer speed control, Vari-pitch V-belts, hydraulic couplings and Reeves drive. Airflex clutches connect various paper machine sections to the main drive. The paper machine has a centralized lubricating system interlocked with the main drive. Pump stuffing boxes are equipped either with water or mechanical seals.

Equipment is selected and arranged to result in an integrated mill that receives logs, chips or bales of pulp, and produces rolls of newsprint, tissue or bales of paper in a continuous operation. Various sections also can be isolated and run one at a time or several at a time, but independent of each other.

CELANESE CORP.'S PULP MILL ON WATSON ISLAND NEARING COMPLETION

Steel construction has been completed on several buildings of the Columbia Cellulose Company, Ltd.'s high alpha pulp plant being erected seven miles from Prince Rupert on Watson Island, British Columbia, and work is proceeding satisfactorily in all directions, according to C. H. Klotz, project engineer. Work was begun in 1947 (cf. P.I. and P.W. October, 1947, page 938, and August, 1949, page 568) on this plant being built by a subsidiary of the Celanese Corporation of America.

Installation of underground sewers, pipe lines and water mains is well advanced, and the large aggregate and batch plant is functioning successfully. All the steel for the office building and pulp storage building has been erected, and it is hoped that within the next five or six weeks the office building will be available for occupancy.

Foundations and footings on a number of the processing buildings are now ready to receive the steel work. Excavation work is virtually completed in preparation for the erection of the boiler house, coal hopper and conveyor buildings. Within the last few weeks contractors began the fabrication on the plant site of wall panels and roof slabs, which consist of a layer of Foamglas insulation between two layers of concrete. This novel assembly will be used in certain departments of the plant.

Workers now engaged in miscellaneous activities of Columbia Cellulose have passed the 700 mark, an increase of approximately 17 per cent during the last month.

▼

NEWSPAPER PUBLISHERS INVITED TO CONFERENCE ON NEWSPRINT IN QUEBEC

Invitations have been issued to representatives of the newspaper publishing industry to attend a conference in Quebec City, Quebec, October 12-14. It is understood that the agenda will closely approximate that at the conference in Milwaukee.

General purpose of the meeting is to explore the statistical background of the situation and to arrive at probable demand and supply future figures.

At the present time the North Amer-

PAPER · · · America's 6th Industry

NOISELESS PAPER POP CORN BAGS

(NEWS ITEM: *It is estimated that 90 million noiseless paper pop corn bags are used annually in New York City movie houses.*)

The movie people have discovered a way to please pop corn enthusiasts without disturbing theatre-goers. They use a new type of noiseless paper bag made of facial-like tissue. To foil noise-loving small fry, holes are punctured along the sides of bags during manufacture, eliminating the usual farewell burst of noise from empty bags. Manufacturers' names on request.

Disposable paper shipping pallets . . . waterproof paper shower slippers . . . flower pots made of paper . . . new uses for paper calling for new standards of lightness and toughness, new standards of quality in performance.

To meet these new responsibilities and new opportunities developed by the Pulp and Paper Industry, the Puseyjones Organization is now devoting itself completely to the design and construction of Paper-Making Machinery built to new high standards of speed and efficiency, and to the modernization of existing machines.

Additional capacity in Metals Fabrication is now available through conversion of facilities formerly devoted to the building of ships.

Puseyjones Engineers will welcome the opportunity to work with you in solving production problems.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U.S.A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

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WEST
1949 Fall Meeting
TAPPI, Portland, Ore.

ican newsprint situation is considered just about in balance from the standpoint of Canadian producers, the United States being the big market. An exchange of views with U.S. publishers will go a long way to clarify the outlook.

▼

ALBERTA FORESTRY DEPT. WILL BEGIN AERIAL SURVEY

The Alberta Department of Lands and Forests has announced that work is to commence immediately on aerial survey and mapping of 180,000 square miles of unmapped provincial territory, which will complete the mapping of the entire province.

In addition, a forest inventory, covering an area of 95,000 square miles, will be compiled by photographic methods. Alberta forest operators will reap rich benefits from the new survey. They will have access to photographs, 1 inch maps, and inventory information in planning their operations.

Photography is expected to be completed by the end of 1951. Interpretation, mapping, and forest inventory work will be carried out following the aerial job.

▼

BANKRUPT QUEBEC P&P CHICOUTIMI PLANT IS BOUGHT BY QUEBEC GOVT.

Announcements through the Canadian press on August 10 stated that the Quebec Government has purchased the property of the bankrupt Quebec Pulp and Paper Corporation in the Chicoutimi district. The price was given as $1,500,000.

The company has been in bankruptcy for approximately seven years, during which time the plant has remained idle.

Included in the assets are 666 square miles of timber limits, 131 square miles of forest concessions, two waterpower sites, houses, and power transmission lines.

Tuition-Refund Plan Established by Ohio Boxboard Co. . . . Service Pins Awarded

▶▶▶ A NEW EDUCATIONAL policy has just been inaugurated by The Ohio Boxboard Company, Rittman, Ohio. Under this unique plan, the company will refund tuition expended by any employees who enroll for correspondence courses or night school classes. The company feels this will raise the quality of its personnel because it will help factory and office workers who wish to study subjects closely related to the work they are doing.

Under certain conditions, one-half of the tuition expense incurred by an employee will be refunded when he has successfully finished his course. Any employee who is interested, first talks the matter over either with his supervisor or with the personnel department. It is necessary that the supervisor okay the course selected to make sure that it will help the employee in his work.

Fred Hartman, research and development department, receives the first tuition-refund check granted by The Ohio Boxboard Co. from training director Lew Smith

The personnel department then investigates the institution giving the course to see that the instruction meets certain standards.

After the employee's application to come under the program has been approved, he is then ready to be enrolled. After he has completed his course, he should furnish evidence of satisfactory completion and of the amount he has paid for tuition. The personnel department will then arrange for a refund of one-half of the tuition expenses.

This company recently awarded service pins to 27 employees representing 290 years of service. Recipients of these awards included eight men who have rounded out 20 years of employment with the company. The veteran honor, however, went to William Seebauer, who has a quarter of a century service with the company.

Sixteen five-year pins were presented to four women and 14 men.

▼

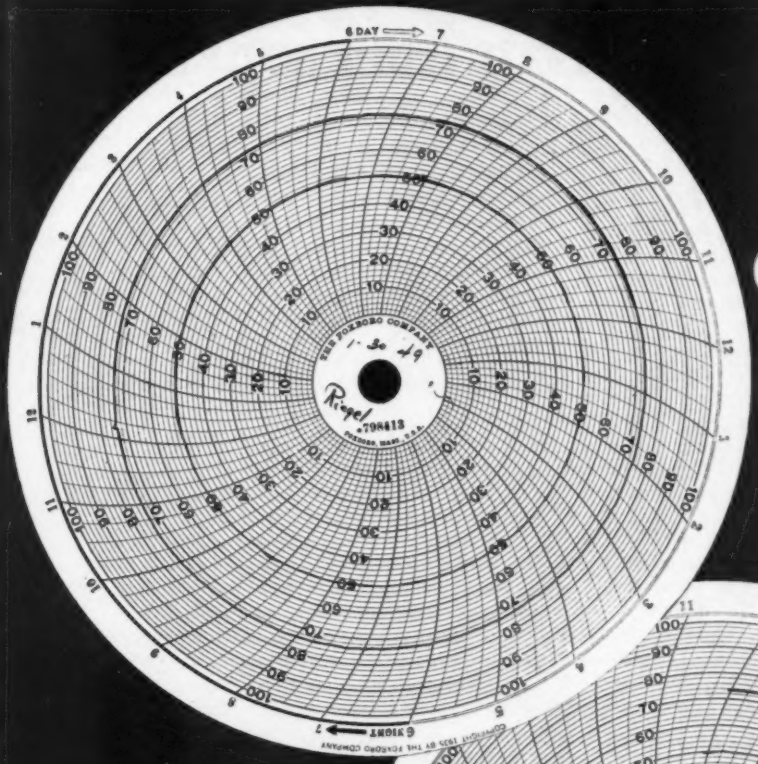
IMPORT NOTES

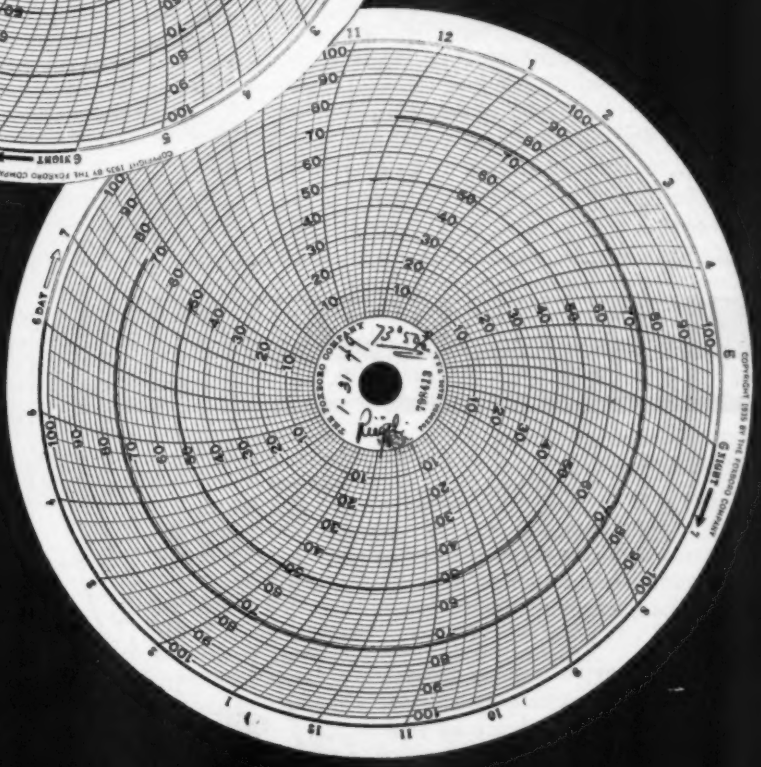
The importer of a Canadian watermarked sulphite bond paper has abandoned his claim that the paper was properly dutiable at one-fifth of one cent per pound and 5 per cent as printing paper, according to Warren B. Bullock, manager of the Import Committee of the American Paper Industry. Customs officials had levied a duty of three cents per pound and 15 per cent with the rate for writing paper, and the importer carried the case to the United States Customs Court, but later abandoned his claim when the case was called for trial.

New cases in United States Customs Courts include protests by importers of two large shipments of Canadian toilet paper who object to the classification of their shipments as manufacturers of paper at 35 per cent and claim the lower rate of 2½ per cent and 7½ per cent provided for tissue paper. At New Orleans an importer of paper for a newspaper claims that paper weighing over 35 pounds per ream, contain-

Group of employees representing nearly 300 years of service with The Ohio Boxboard Co. Award pins were given at an honorary dinner

ROSS
AIR CONDITIONING





ACTUAL CHARTS OF CONSTANT TEMPERATURE AND HUMIDITY ROOMS AT RECENT INSTALLATION OF RIEGEL PAPER CORPORATION, MILFORD, N. J.

ROSS SYSTEMS

J. O. ROSS ENGINEERING CORPORATION

MANUFACTURERS OF AIR PROCESSING SYSTEMS

350 MADISON AVENUE NEW YORK 17, N. Y.

201 N. Wells Street, CHICAGO-6 • 79 Milk Street, BOSTON-9 • 9225 Grand River Avenue, DETROIT-4 • 600 St. Paul Avenue, LOS ANGELES-14
ROSS ENGINEERING OF CANADA, LIMITED, MONTREAL 32, CANADA • CARRIER-ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

ing over 35 per cent sulphite and more than 4 points in thickness, is duty free as standard newsprint and not dutiable at the rate for printing paper as held by Customs officials.

▼

▶▶▶ NEW CONSTRUCTION is marking the 94th year expansion plan of the Graham Paper Company. The warehouse and office facilities are being increased at the main office in St. Louis by a $125,000 addition, the Chicago division has moved to larger and better equipped quarters, the Knoxville, Tennessee, has moved into an ideally situated, modern building, and the Jackson, Mississippi, division has opened a sales office and warehouse to handle increased business.

▼

▶▶▶ THE OREGON STATE Sanitary Authority has notified five Willamette River pulp and paper mills that they must cease polluting the Willamette with industrial waste by December 31, 1951, or cease operations. The mills are the Crown Zellerbach plants at West Linn and Lebanon, the Publisher's Pulp and Paper Company at Oregon City, Spaulding Pulp and Paper Company at Newberg, and the Oregon Pulp and Paper Company at Salem.

▶▶▶ ESTABLISHMENT OF a Southwestern Sales office, located in the recently completed Mercantile Securities Building, Dallas 1, Texas, has been announced by The Champion Paper and Fibre Company, Hamilton, Ohio. Sterling Brown comes to the new office as manager after eight years in Champion's Chicago and St. Louis sales offices. His eighteen years of experience in the paper industry qualify him to be of service to paper users in the Southwest.

Sterling Brown

▼

▶▶▶ APPROVAL OF A proposed plan to establish a Grays Harbor federal sustain yield unit was given by the Western Forest Industries Association at a recent U. S. Forest Service hearing at Aberdeen, Washington. The area comprises over 116,000 acres of the Olympic National Forest.

▼

▶▶▶ THE ERECTION OF a 10 to 12 million dollar pulp and paper mill in the Edmonton, Alberta, area and the use of 1,500 square miles of timber lands to the west has been approved for R. O. Sweezey, Montreal financier, by the Alberta Cabinet (cf. P.I. and P.W., July, 1949, page 444). Actual site is not stated, but it is believed to be immediately east of the city limits. Mr. Sweezey has been given two years to decide on the wide areas allowed him, and no date has been set for start of construction.

▼

▶▶▶ NEW AGENT for the sale of paper and paper products of The J. L. N. Smythe Company, Philadelphia, is Alan B. Helffrich Company, a newly-formed organization located at 369 Lexington Avenue, New York City. The Helffrich Company will represent Smythe as exclusive selling agents in territories normally outside of its Philadelphia trading area, specializing chiefly in the printing, converting, and publishing fields.

▼

▶▶▶ OVER 90 PER CENT of the eligible employees of The Gardner Board and Carton Company, Middletown, Ohio, have joined the company's new retirement plan which became effective August 1. A total of 969 employees at Middletown, Lockland, and in outside sales offices were eligible. A 75-per cent participation by eligible employees was necessary to put the plan into operation.

▼

▶▶▶ EXPORT CONTROLS on 27 nonstrategic commodities were relaxed September 1 by the Canadian government. Among the items placed under general export permits are paper and paper products (except building boards). This movement is in line with that government's policy to gradually relax and remove export controls imposed on scarce commodities during the war.

▼

▶▶▶ THE REOPENING of its Woodfibre and Port Alice rayon mills on September 17 and October 3, respectively, has been announced by British Columbia Pulp and Paper Company, Ltd., Vancouver, Britsh Columbia. Improvement in the U.S. rayon market and reduction in stocks by the three-month closure are believed to have caused the decision.

▼

▶▶▶ THE FOLDING CARTON machinery and equipment of the Bemis-Jason Company, San Francisco, have been leased by the Container Corporation of America's wholly-owned subsidiary, California Container Corporation. Bemis-Jason will continue to manufacture its line of corrugated specialties at its present location.

A STEBBINS LUMP SUM CONTRACT IS AN INVESTMENT IN

WHETHER the contract covers one chest or tank lining, or all the corrosion or alkali resistant linings for the entire mill, it is Stebbins responsibility to provide a dependable and satisfactory job that assures continuous operation.

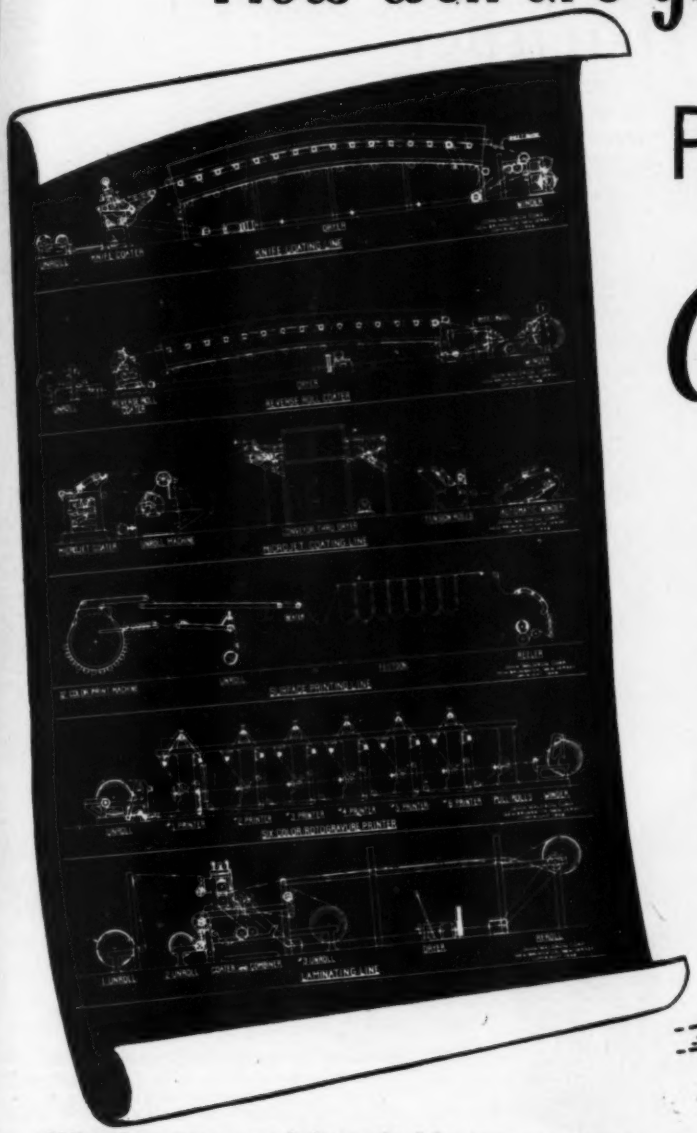
Sixty-four years experience in designing, installing and servicing linings in pulp and paper mills is back of this contract.

Thousands of successful installations located on this continent and abroad provide tangible evidence of reliability.

Think twice before investing in linings —the wrong one can prove very costly— be safe, specify Stebbins—and have no regrets.

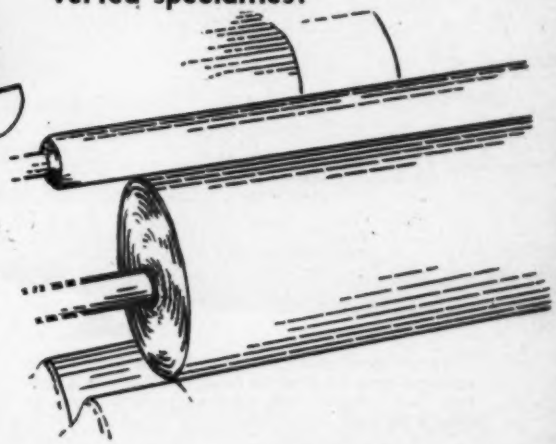
SEMCO
Stebbins Engineering and Manufacturing Company
EASTERN BOULEVARD, WATERTOWN, NEW YORK

How well are you equipped for



PAPER or TEXTILE Converting

With steadily expanding developments in new products and the return to competitive selling conditions, the plant with the most adequate range of processing equipment is in a most advantageous position. The WALDRON machine lines shown at left are available for efficient processing of practically any type of product embodying a paper or fabric base. How many of the new types of such products can your present equipment handle? How well are you prepared to keep apace with the expanding variety of converted specialties?



Whether you are interested in one or more of the complete machine lines shown above or in individual units to complete your present lines, our capable engineers can help you to achieve streamlined operation for greater speed and economy. Your inquiries will be welcomed.

Coating Machines
Creping Machines
Embossing Machines
Floor Cov. Machines
Gumming Machines
Laminating Machines
Printing Machines
Rubber Mill Machines
Wall Paper Machines
Waxing Machines
Winders and Slitters
Special Design Machines

JOHN WALDRON CORP.

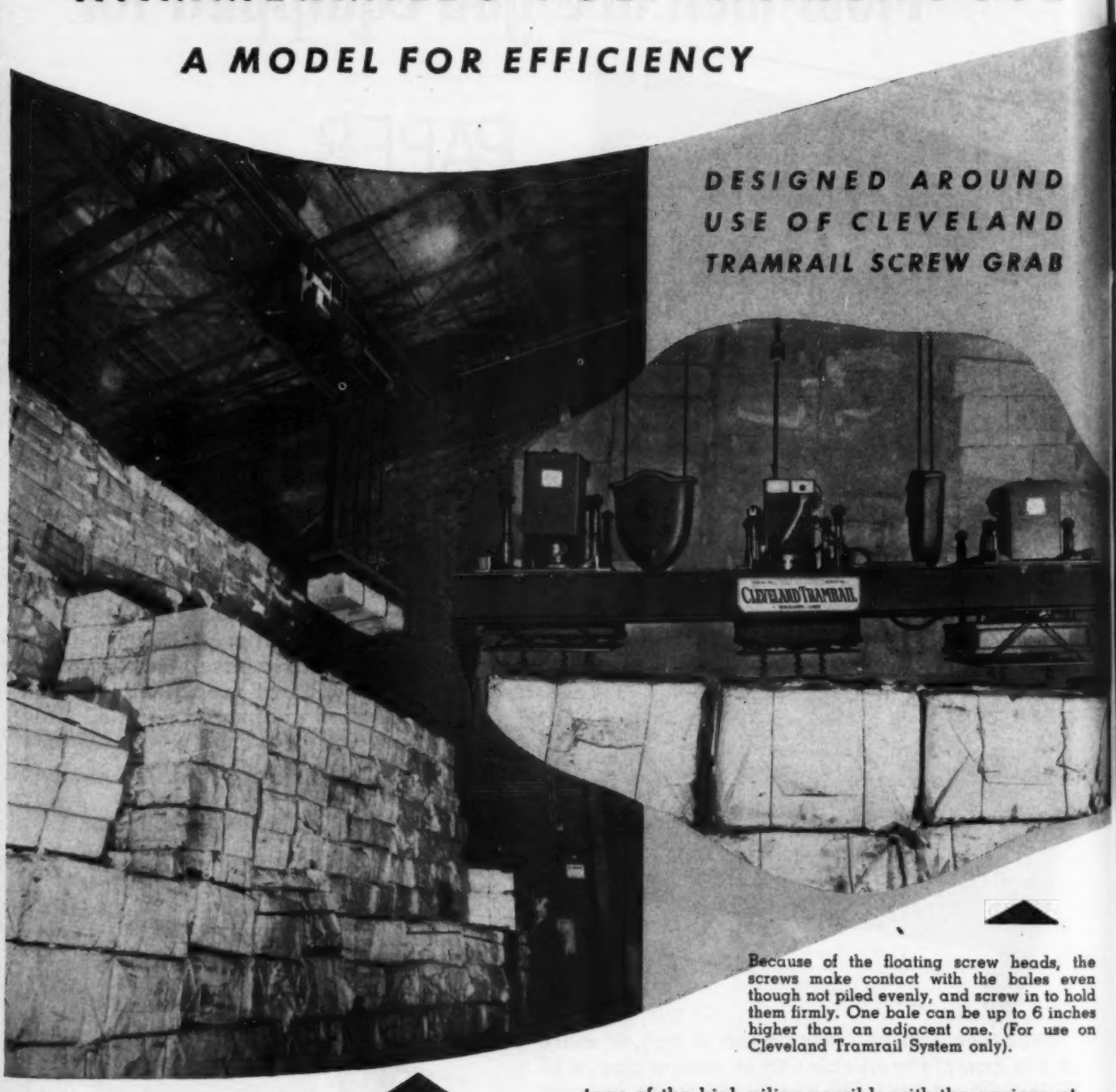
Main Office & Works

NEW BRUNSWICK, NEW JERSEY

BUILDERS OF QUALITY MACHINES SINCE 1827

HAMMERMILL'S PULP WAREHOUSE

A MODEL FOR EFFICIENCY



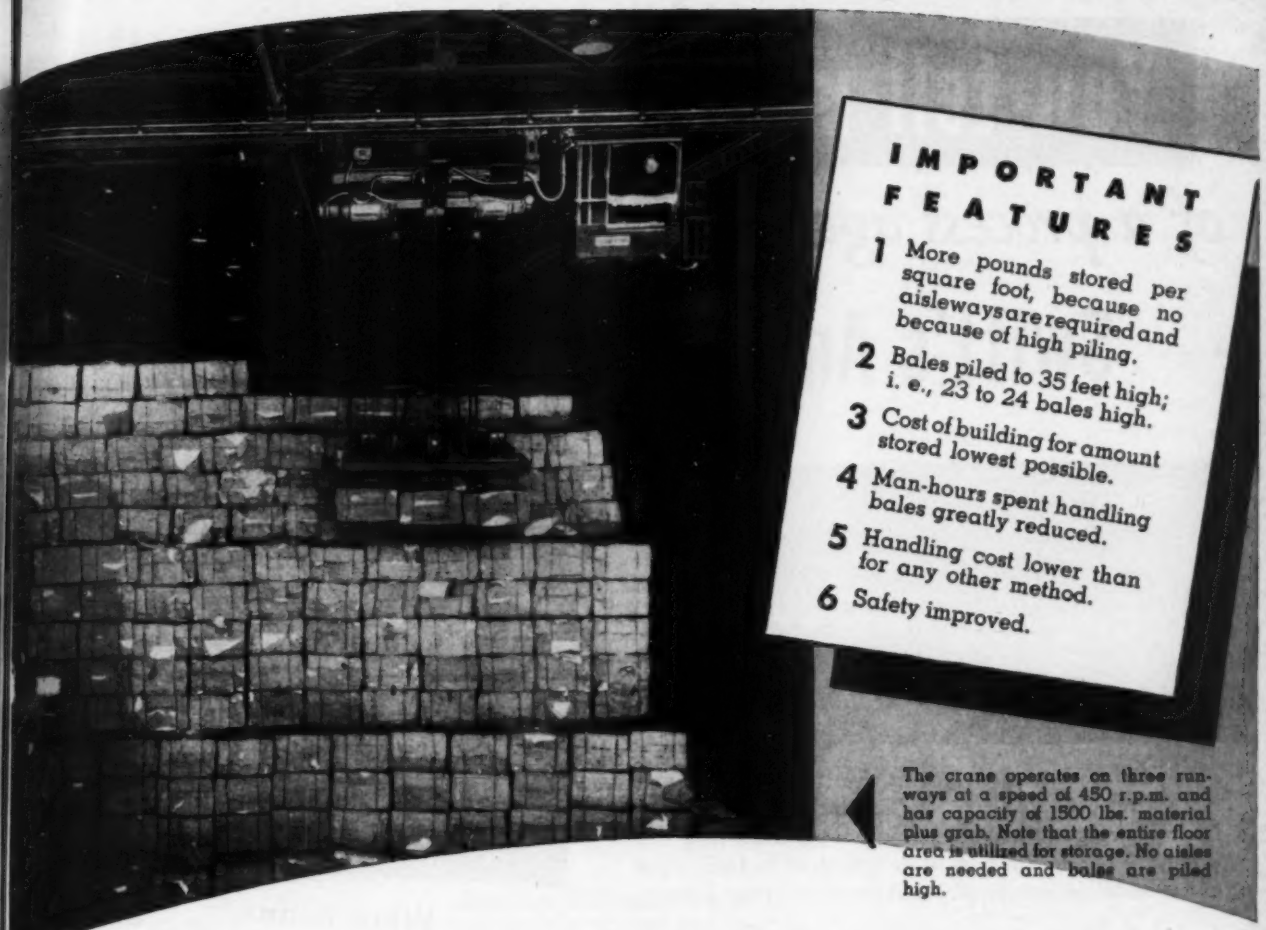
Because of the floating screw heads, the screws make contact with the bales even though not piled evenly, and screw in to hold them firmly. One bale can be up to 6 inches higher than an adjacent one. (For use on Cleveland Tramrail System only).

The ease, speed and accuracy with which the crane operator spots the grab on bales far below is amazing. The distance from tramrail runway track to floor is 45 feet.

The large pulp storage warehouse of the Hammermill Paper Company, Erie, Pennsylvania, completed in 1948, is an outstanding example of efficiency secured through careful advance planning. Having decided that a Cleveland Tramrail Crane and Screw Grab would best serve their needs, they designed a building to properly accommodate a crane and of sufficient height to enable taking advantage of the high piling possible with the equipment.

As a result, Hammermill has a warehouse which will store more pulp for the cost of building than otherwise would be possible. Further, it can handle the pulp in and out of storage at a figure below that possible with any other method.

The warehouse, which has a capacity of 5000 tons, is used primarily for storage of Canadian and Swedish pulp that goes into the fine bond papers for which Hammermill is nationally famous. The pulp comes in packages and is piled up to 35 feet high or stacks of 23 or 24 packages.



IMPORTANT FEATURES

1. More pounds stored per square foot, because no aisleways are required and because of high piling.
2. Bales piled to 35 feet high; i. e., 23 to 24 bales high.
3. Cost of building for amount stored lowest possible.
4. Man-hours spent handling bales greatly reduced.
5. Handling cost lower than for any other method.
6. Safety improved.

The crane operates on three runways at a speed of 450 r.p.m. and has capacity of 1500 lbs. material plus grab. Note that the entire floor area is utilized for storage. No aisles are needed and bales are piled high.

The screw grab has three floating heads, each with three motor-driven screws or augers that screw into pulp and hold it secure when in transit. Three bales can be handled at a time. Because of the floating heads, bales can be picked up even when stacked unevenly and with tops as much as 6" below one another. A light on each head, visible to the crane operator, indicates when the bales are firmly in position.

The handling of all pulp into and out of the warehouse is done by two men, one on the floor and the other in the crane cab. 200 tons can easily be handled in and out of the warehouse in an eight hour day. The bales weigh from 400 to 425 pounds each.

Another feature of the warehouse is the improvement in safety. Because all bales are handled by crane, there is no need of hand-handling and no possibility of usual back strains. Likewise, there is no need of men walking on top of piles and consequent dangers are removed.

THIS BOOKLET STARTS YOU OFF!

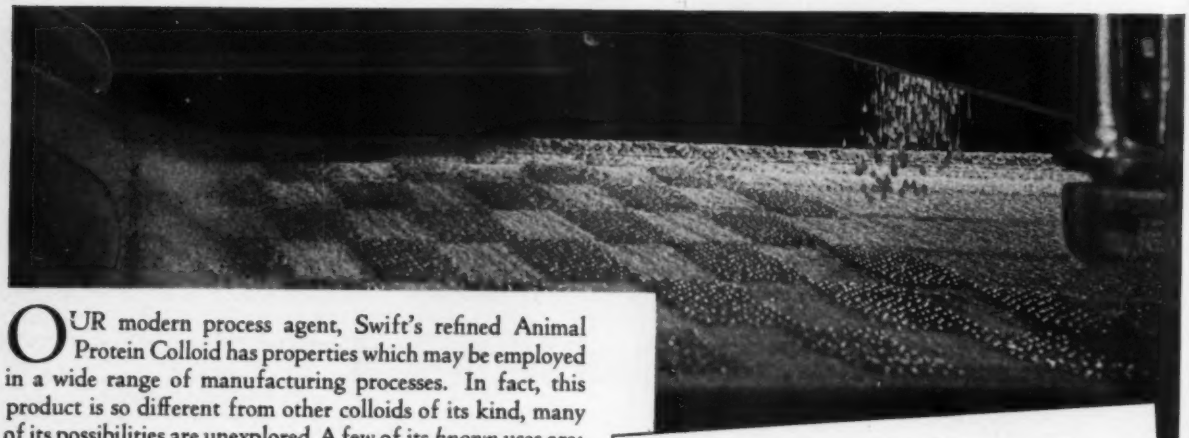
Thought-provoking. Informative. Graphically-presented. Write for free copy Booklet No 2014

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7016 East 287th Street. Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

You tell us! *What uses can be made of a process agent as clean as...*

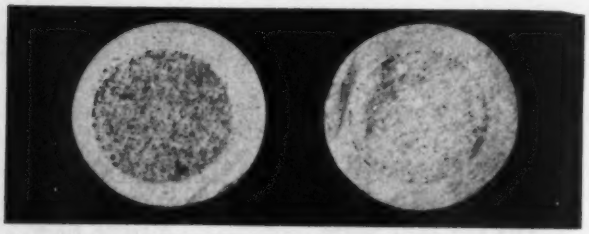
Swift's Animal Protein Colloid?



OUR modern process agent, Swift's refined Animal Protein Colloid has properties which may be employed in a wide range of manufacturing processes. In fact, this product is so different from other colloids of its kind, many of its possibilities are unexplored. A few of its *known* uses are:

1. An emulsifier
2. A flotation agent
3. A gel structure
4. A settling agent
5. A protective coating
6. A sizing agent
7. A carrier of pigments
8. An impregnating agent
9. A base for pigments
10. An oilproofing agent
11. A flocculating agent
12. A clarifying agent
13. A filtering agent
14. A stiffening agent
15. A mordant
16. An adhesive

...but there may be many *others* of equal value!



Here a filter test indicates the relative cleanliness of this new process agent. Left: Ordinary commercial grade bone glue. Right: Swift's Animal Protein Colloid.

Try it for yourself. We invite you to test the possibilities of Swift's Animal Protein Colloid. It may meet your present requirements or help you to develop new products or more efficient processes.

For further information about Swift's Animal Protein Colloid write: →

What is this modern process agent?

Swift's Animal Protein Colloid is made by an exclusive Swift process. This process makes possible the production of high quality protein colloid of unusual uniformity in particle size and composition.

In a spotless modern plant, protein liquor falls on a bed of dry finished product (see photograph) which adheres evenly to the droplets. By continuous schedule, under precise control every second, these droplets are dried, milled and screened.

During this almost automatic operation, the product has no contact with materials which could contaminate it with foreign substances.

As a result, Swift's Animal Protein Colloid is a clean, finely ground powder (light amber in color) which goes into solution rapidly.

Swift & Company

Adhesive Products Department

4123 Packers Avenue

Chicago 9, Illinois

Allied . . . . . .

MANCHESTER MACHINE CO. HAS ACQUIRED BEVIS ASSETS

The Manchester Machine Company, Middletown, Ohio, has acquired the assets of the former Bevis Machine Company of that city. The Manchester Machine Company is a wholly-owned subsidiary of The Gardner Board and Carton Company, Middletown.

Equipment purchased from Bevis includes large lathes, vertical boring mills, large and small roll grinders, radial drills, and various automatic machines. The machine shop equipment of Gardner Company is also to be transferred to Manchester. A modern, well-equipped welding shop is included in the facilities of the new company, which will manufacture, sell, service, and repair all types of industrial machinery.

James Boyd, president of the new company, is a veteran of the industrial machinery industry. He was with Westinghouse Electric Corporation for 31 years, resigning in 1948 to become general sales manager of Lima-Hamilton Corporation's Hamilton, Ohio, division.

Other officers of the company are Floyd W. Lockard, treasurer, and Irvin Hurr, secretary. Colin Gardner III, E. T. Gardner, Jr., and W. B. Turner will serve on the board of directors with Boyd and Lockard.

At the outset, the new firm will employ about 40 people. The Gardner company announced that it would close its present machine shop and transfer the activities, personnel, and equipment to the new company. Gardner plans to use its present machine shop site to expand mill operations. Employees of the Manchester firm are all experienced machine shop hands from Bevis or Gardner. Most of the former Bevis employees accepted employment with the new company.

▼

MONSANTO HAS NEW RESIN— IT'S A POWDERED MELAMINE

Development of a powdered melamine resin for decorative laminating with an incorporated flow inducer has been announced by Monsanto Chemical Company, St. Louis, Missouri.

The improved resin has been designated Resimene 820. Resins of this type, which formerly were available in syrup form only, are used to produce higher gloss, greater transparency in decorative panels, and improved production at lower laminating pressures.

▼

GRAVER ESTABLISHES NEW DIVISION TO EXTEND WATER CONDITIONING OPERATIONS

The establishment of the Graver Water Conditioning Company as a division of Graver Tank & Manufacturing Company, Inc., East Chicago, Indiana, has just been announced. This new division will extend the operations which have been conducted by the Graver Water Conditioning and Process Equipment Department.

Headquarters of this division will be in the company's offices, 216 West 14th Street, New York City.

Graver has been actively engaged in the water conditioning field for 40 years, and the expansion of the staff and facilities which accompanies this development enables the company to provide individualized and complete technical, chemical, engineering, manufacturing, and erection services for all water treatment and liquid conditioning requirements.

▼

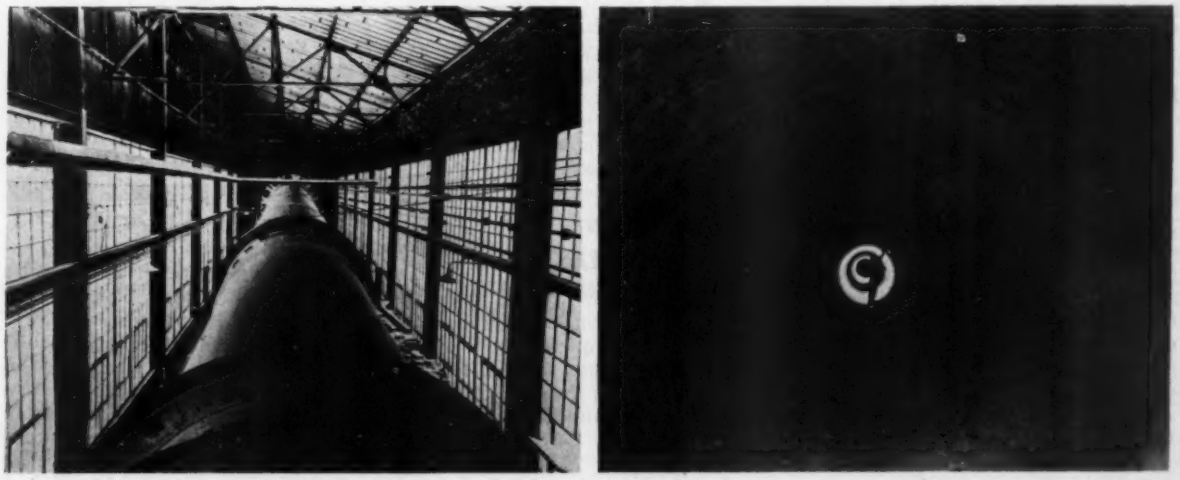
▶▶▶ A NEW DEPARTMENT announced by Detrex Corporation, Detroit, will handle process engineering. It will be headed by George W. Pew. In addition to handling engineering requirements of Detrex factories, other than product design, this department will investigate and make recommendations on operating methods and fabricating processes.

▼

HOUGHTON SEPARATES ITS EASTERN SALES DIV. INTO NORTH & SOUTH SECTIONS

Several changes in the Eastern Sales Division of E. F. Houghton & Company, Philadelphia, have been announced. The division itself has been split into two sections: Eastern Sales North, which will include New England and New York State, and Eastern Sales South, including Pennsylvania, New Jersey and Delaware.

Orum R. Kerst will head the north section, and J. R. Clendenning will take over the south. A. C. Smith, former assistant to the eastern sales manager, has been promoted to the



Exterior and interior views of giant rotary kiln for the calcination of titanium dioxide at the Gloucester plant of the American Cyanamid Co. Calco Chemical Division

newly created post of sales co-ordinator for the two eastern sections. Mr. Kerst joined Houghton in 1938 as a technical staff man, and was appointed sales representative in New England in 1940. He will continue to make his headquarters in Worcester, Massachusetts. Mr. Clendenning's service with Houghton began in 1929 when he joined the laboratory staff. His headquarters will be in the company's main office in Philadelphia.

▼

DETREX INTRODUCES NEW CONSULTING ARRANGEMENT

An improved type of consulting arrangement has been established by the Detrex Corporation, Detroit, to provide customers with the kind and degree of cleaning desired at the lowest possible cost.

Industrial product engineering, estimating, quotations, orders, and customer field service are now combined under T. J. Kearney, chief engineer, in the equipment division. Direct exchange of information with the research and development department is another feature of the arrangement.

Mr. Kearney has appointed S. G. Lakatos in charge of quotations and orders, and H. S. Tweedy to head the active field service.

▼

▶▶▶ NEW LABORATORIES for metallurgical, physical, and chemical research have been recently completed for Edward Valves, Inc., East Chicago, Indiana, and are now in operation. Manned by skilled laboratory engineers, these new laboratories will be used for extensive research and development work on Edward and Nordstrom steel valves. They are the only laboratories in the world devoted exclusively to steel valve research and the problems related to the manufacture of steel valves.

▼

PILLSBURY ENZYMES NOW MAY BE HAD IN CAPSULES

A totally-new field in the market of industrial enzymes has been announced by Pillsbury Mills, Inc., Minneapolis. These enzymes, at present marketed among large paper producing companies, are used in the preparation of starch before coating paper. Heretofore, they have been marketed in powdered and liquid form packaged in large cannisters. This method was hard to handle, and wasteful. Pillsbury now sells them in pre-measured units, capsuled like large vitamin pills.

In announcing this new idea, Burton F. Bowman, director of Pillsbury's new Industrial Products Division, points out that enzymes are a scientific commodity and that they have many industrial uses other than the preparation of starch adhesives. This new Division was established in June, and is made up of technical, field, and administrative staffs.

▼

▶▶▶ THE FIRST PHASE of an $11,500,000 modernization program for A. E. Staley Manufacturing Company has been completed. Three new buildings and an expansion of the power house have been completed, and work is continuing on the renovation of the processing equipment. The new buildings consist of a three-story shop and service building, a four-story feed packing house, and a single story first aid and hospital building.

▼

KLEMP CO. MOVES SOME OPERATIONS TO ITS NEW PLANT IN HOUSTON, TEXAS

A new plant just opened in Houston, Texas, by William F. Klemp Company, is located at 7700 Wallisville Road. During the war, this plant was part of Howard Hughes' strut plant. In this new plant, the Klemp Company (main headquarters in Chicago) will produce many of its products including FLOORSTEEL Flexible Floor Armor and Flexible Open Steel Conveyor Belt.

H. L. Thompson, who has been the Houston representative of the company for the past 20 years, will be sales representative for the new plant. In charge of plant operations will be Gonzalo Jauma, a veteran from the Chicago plant; he will be assisted by Russell Milehan. Emerson C. Whitney is president of the company.

▼

▶▶▶ RECENT ACQUISITION by Polymer Industries, Inc., Astoria, New York, of the Willard Paste and Glue Company plant in Brooklyn, New York, has been announced. Polymer Industries manufactures waxed bag adhesives, paper coating compounds, etc., and the Willard operations will supplement this line with tube winding, case and carton sealing, flexible glue, and other adhesives.

▼

ARIES WILL HEAR COURSE ON INDUSTRIAL MARKETING

A new course emphasizing the engineer's approach to industrial marketing will be presented this fall by the Graduate School of the Polytechnic Institute of Brooklyn, Brooklyn, New York.

The course in "Industrial Marketing," under the guidance of Prof. Robert S. Aries, will stress the discussion and evaluation of distribution patterns of industrial goods and their relation to the manufacturing processes. Marketing policies, techniques of distribution, pricing, advertising, and technical sales and service will be covered. Dr. Aries, an industrial marketing consultant and engineer, is author of "The Marketing of Chemical Products."

▼

CAMERON COMBINES FORMAL OPENING OF A NEW PLANT WITH ANNUAL MEETING

The annual sales meeting of the Cameron Machine Company, Brooklyn, New York, held August 15 to 19 was highlighted by the formal opening of Cameron's plant No. 2. Located in the Williamsburg section of Brooklyn, the entire capacity of the new plant will be devoted to the production of rolls for slitting and winding machines used by the paper and textile industries.

Attended by the company's sales and service men from the United States and Canada, the week-long sales meeting program was directed at acquainting the men in the field with recent developments in machine design improvements in both mill type and converters.

▼

▶▶▶ A NEW NAME for Burrell Technical Supply Company, Pittsburgh, became effective August 1 when the State of Pennsylvania officially amended the company's charter to permit it to conduct business as the Burrell Corporation.

▼

▶▶▶ THE OPENING OF a new modern warehouse in conjunction with new expanded facilities for the Dallas district sales office at 1611 Dragon Street, Dallas, Texas, has been announced by Chain Belt Company of Milwaukee, Wisconsin. This new warehouse will give Chain Belt distributors and customers in the area prompt, off-the-shelf service.

▼

FALL COURSE OF STUDY ON INSTRUMENTATION BY FISCHER & PORTER

The Fischer & Porter Company has announced a number of vacancies for its next instrumentation course to be held at the Hatboro, Pennsylvania plant, October 10 through 14, 1949.

The course will cover manufacture, calibration, installation, operation, and maintenance of the company's complete line of *Flowrator* primary and secondary process control instruments. (Some time is also devoted to the basic principles of variable-area flow measurement.) It is designed for engineers responsible for process control

instrumentation and for instrument specifications, installation, operation, and maintenance.

Some guest accommodations in the town of Hatboro are available by prearrangement and there are frequent trains to Philadelphia, about 18 miles away. Further details can be obtained by writing to the Fischer & Porter Company, East County Line Road, Hatboro, Pennsylvania.

▼

▶▶▶ APPOINTMENT OF the Hines Bearings and Industrial Supply Co., of Billings, Montana, as distributor of Hewitt industrial rubber products in Billings and surrounding territory has been announced by Hewitt-Robins Incorporated, Buffalo, New York.

▼

BURRILL PARAMOUNT LINE TAKEN OVER BY STARRETT

Purchase of the Burrill Saw and Tool Works, Ilion, New York, has been announced. L. S. Starrett Company, Athol, Massachusetts, has taken over the Burrill line of Paramount knives and band saws, and these products are now being manufactured exclusively by Starrett at its Athol plant, and the distribution is handled under the Starrett name through that company's distributors.

Production of this new line has necessitated expansion at the Starrett Company plant which has been increased to cover nine acres of floor space.

▼

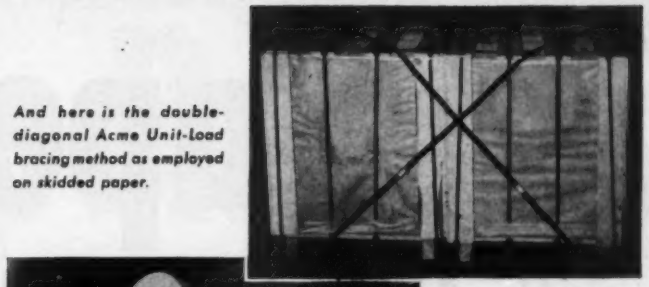
LAWSON ESTABLISHES BRANCH IN CHICAGO

Establishment of a Chicago branch for sales and service of Lawson hydraulic clamp paper cutters and bindery equipment in the central states area was recently announced by the E. P. Lawson Company, New York City.

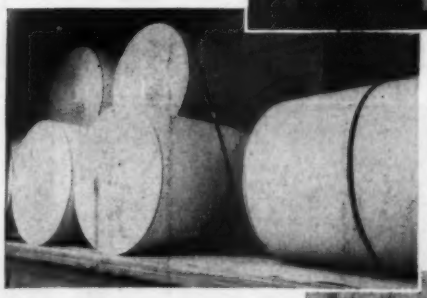
The new office will be located at 623 South Dearborn Street. Anticipation of increased sales of cutters, particularly in view of the forthcoming showing of their automatic spacer, led to this expansion. Other branches are located in Boston, Philadelphia, Atlanta, Denver, Dallas, Los Angeles, San Francisco, and Seattle.

▼

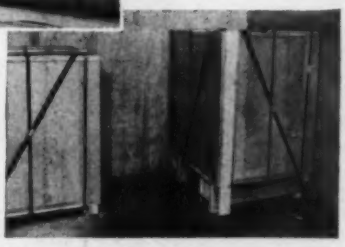
▶▶▶ A NEW PLANT recently completed by Shell Oil Company in Houston, Texas, will produce 75 million pounds a year of paraffin and micro-crystalline waxes, chemically treated to insure purity and stability of color. Equipped with electronic control instruments that provide the most efficient possible operation, the new plant will make all grades of waxes used in the wax paper, packaging, cosmetic, and other industries.



And here is the double-diagonal Acme Unit-Load bracing method as employed on skidded paper.



Rolls of chipboard braced in units by Acme Unit-Load Band.



Individual skids anchored in car corners with diagonally applied Acme Unit-Load Band.

No matter how you ship paper... you can do it safer and at lower cost with ACME UNIT-LOAD BAND

Whether you ship paper in rolls, on skids, in cartons or in cases, there is an approved and tested Acme Unit-Load bracing process to deliver it safely and economically.

Acme Unit-Loading methods for the paper industry were developed after years of study and with the help of shippers, carriers and receivers. They have been proved in practice by leading paper manufacturers in the United States and Canada.

Why not ask an Acme Shipping Specialist to explain how your shipments can be delivered safer *at less cost?* Just mail the coupon today for further information.

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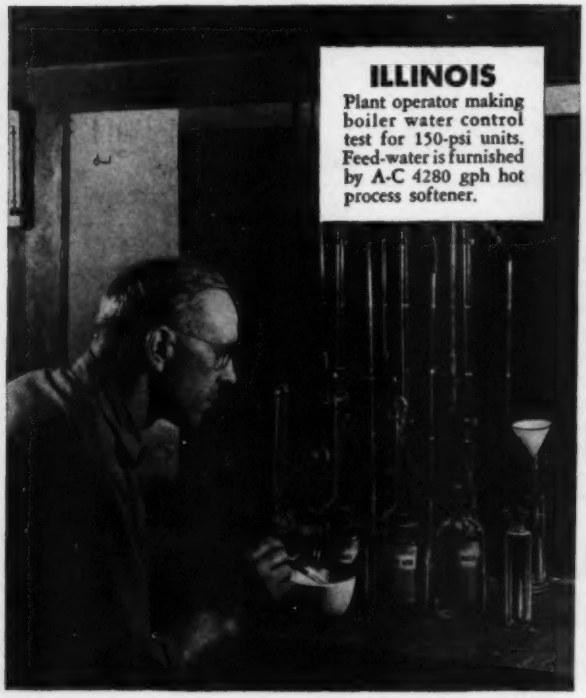
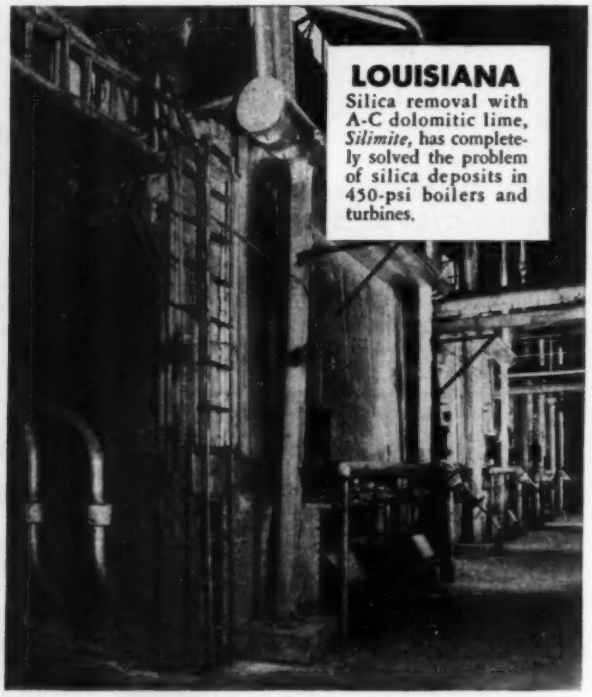
37 Paper Mills

with Allis-Chalmers Water Conditioning



ILLINOIS
Plant operator making boiler water control test for 150-psi units. Feed-water is furnished by A-C 4280 gph hot process softener.



LOUISIANA
Silica removal with A-C dolomitic lime, *Silimite*, has completely solved the problem of silica deposits in 450-psi boilers and turbines.

EXPERIENCE OF PAPER MILLS ACROSS U. S. IS TYPICAL OF ALLIS-CHALMERS AID TO ALL INDUSTRIES FACING WATER PROBLEMS IN STEAM OR POWER GENERATION

WHEREVER WATER IS HARD, high in silica, or contains objectionable material, Allis-Chalmers provides proper treatment to avoid costly damage to boilers, superheaters, turbines and process equipment. That's why these and many other paper mills are finding A-C's 3-way program of Service, Chemicals and Equipment their best means of solving water conditioning problems.

Save Time Trouble, Money, with 3-Way Program!

1. SERVICE

Prompt, regular, personal service calls are the backbone of the A-C program! 1) Survey of plant, securing samples of water from all parts of system. 2) Complete analysis by A-C research lab to provide bases for recommendations. 3) Subsequent checks on procedure, control limits, feeding of chemicals, and factors affecting plant operation.

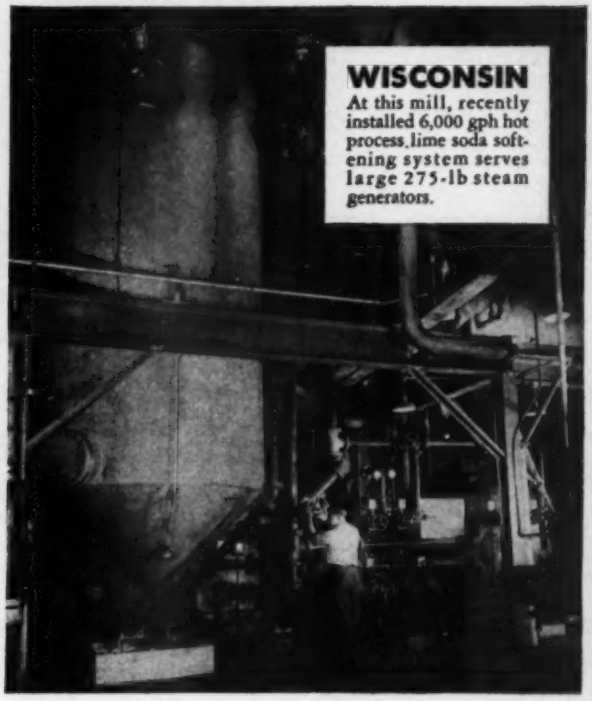
2. CHEMICALS

Properly selected chemicals, correctly applied, assure peak efficiency. A-C engineers give you sound advice on where and how these chemicals can be best used. Formulations include scale inhibitors for all heat exchange cycles . . . special chemicals to prevent boiler scale, control corrosion, reduce silica, and correctly condition sludge.

Get Top Results

Service, Chemicals, Equipment

MICHIGAN
This mill features a newly installed 343,000 gal sodium-hydrogen zeolite combination for feeding 415-psi boilers.



WISCONSIN
At this mill, recently installed 6,000 gph hot process lime soda softening system serves large 275-lb steam generators.

Whatever the industry — paper, petroleum, food, steel — you'll get prompt, convincing results with Allis-Chalmers competent service. Remember, your A-C engineer is prepared to share his experience with you by recommending proper chemicals or helping select the right process for your requirements on the basis of space, cost, and character of raw water. For further information, call your nearest Allis-Chalmers office or write direct.

Silimite is an Allis-Chalmers trademark.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

3. EQUIPMENT

Correct selection of equipment calls for judgment based on experience. From chemical feeder to filter, A-C units are engineered for high treating capacity, built solidly for best operation. Secure your equipment from A-C's line of hot and cold process softeners, sodium and hydrogen zeolites, deionizers, chemical proportioners, filtration systems.

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Please send me bulletins:
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- ☐ 2886611 Hot Process Softeners
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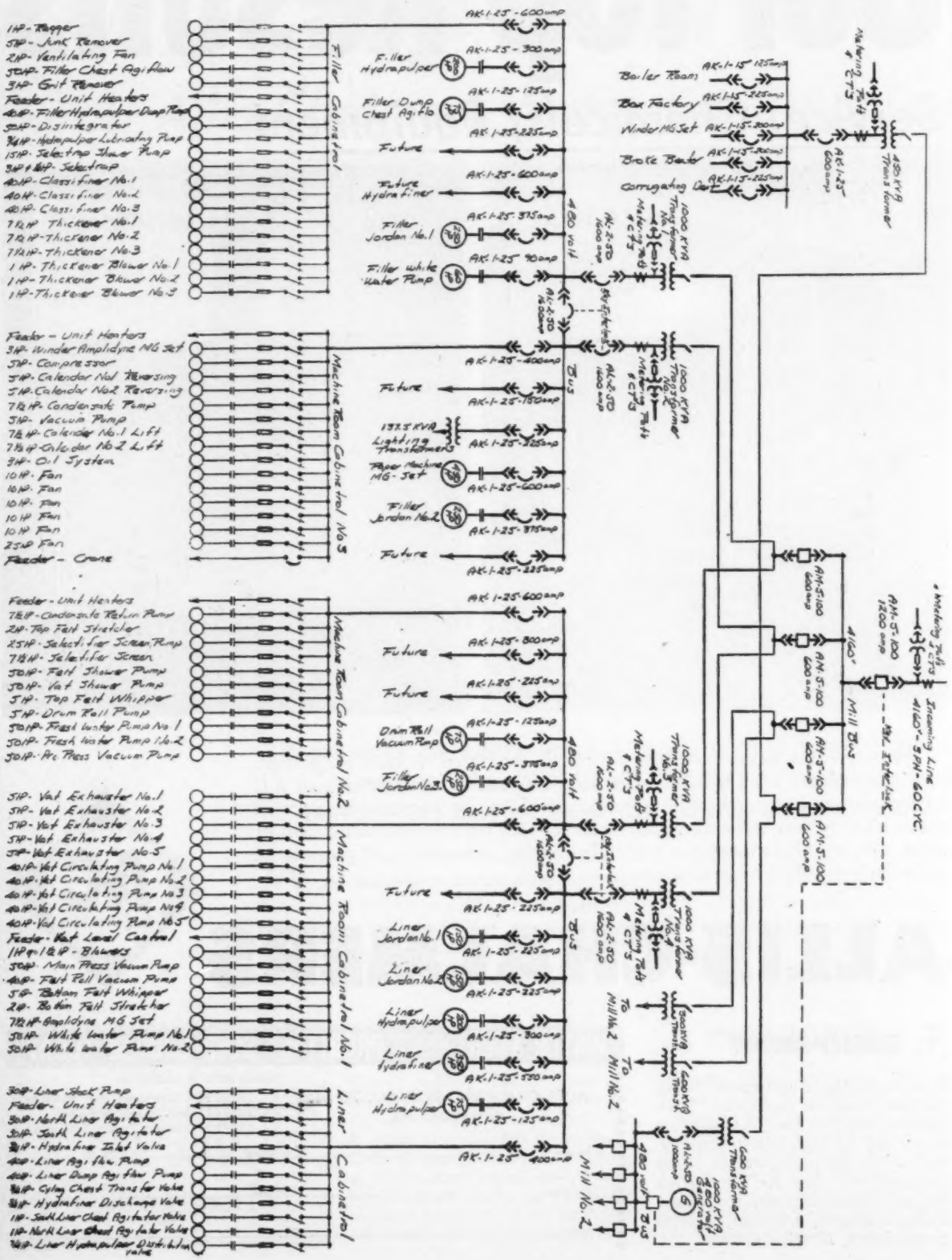
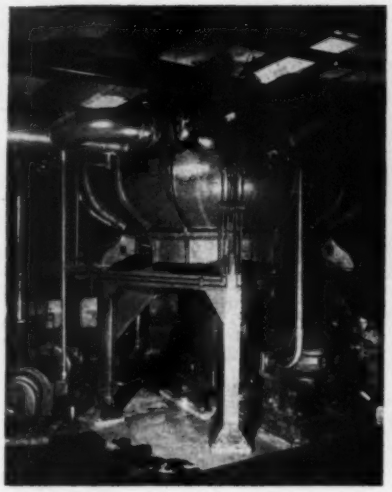
City..... State.....

A-2756

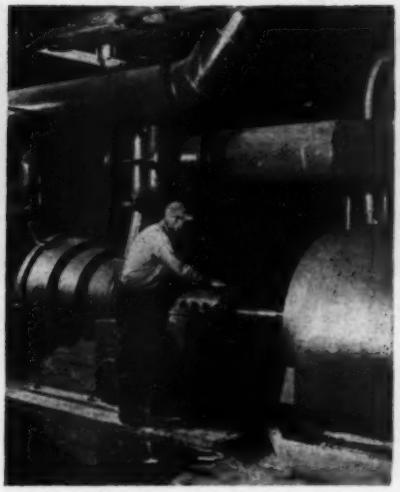
Process Control Co-ordinated


1HP - Flopper
5HP - Junk Remover
2HP - Ventilating Fan
30HP - Filler Chest Agitator
3HP - Grit Remover
Feeder - Unit Heaters
40HP - Filler Hydrapulper Dump Pump
5HP - Disintegrater
¾HP - Hydrapulper Lubricating Pump
15HP - Selectrap Shower Pump
3HP & 1HP - Selectrap
40HP - Classifiner No.1
40HP - Classifiner No.2
40HP - Classifiner No.3
7½HP - Thickener No.1
7½HP - Thickener No.2
7½HP - Thickener No.3
1 HP - Thickener Blower No.1
1HP - Thickener Blower No.2
1HP - Thickener Blower No.3
Filler Cabinet No.1
Feeder - Unit Heaters
3HP - Winder Amplidyne MG Set
5HP - Compressor
5HP - Calender No.1 Reversing
5HP - Calender No.2 Reversing
7½HP - Condensate Pump
5HP - Vacuum Pump
7½HP - Calender No.1 Lift
7½HP - Calender No.2 Lift
3HP - Oil System
10HP - Fan
10HP - Fan
10HP - Fan
10HP - Fan
10HP - Fan
25HP - Fan
Feeder - Crane
Machine Room Cabinet No.3
Feeder - Unit Heaters
7½HP - Condensate Return Pump
2HP - Top Felt Stretcher
25HP - Selectifier Screen Pump
7½HP - Selectifier Screen
30HP - Felt Shower Pump
30HP - Vat Shower Pump
5HP - Top Felt Whipper
5HP - Drum Roll Pump
30HP - Press Water Pump No.1
30HP - Fresh Water Pump No.2
30HP - Pre Press Vacuum Pump
Machine Room Cabinet No.2
5HP - Vat Exhauster No.1
5HP - Vat Exhauster No.2
5HP - Vat Exhauster No.3
5HP - Vat Exhauster No.4
5HP - Vat Exhauster No.5
40HP - Vat Circulating Pump No.1
40HP - Vat Circulating Pump No.2
40HP - Vat Circulating Pump No.3
40HP - Vat Circulating Pump No.4
40HP - Vat Circulating Pump No.5
Feeder - Vat Level Control
1HP & 1½HP - Blowers
30HP - Main Press Vacuum Pump
40HP - Felt Roll Vacuum Pump
5HP - Bottom Felt Whipper
2HP - Bottom Felt Stretcher
7½HP - Amplidyne MG Set
30HP - White Water Pump No.1
30HP - White water Pump No.2
Machine Room Cabinet No.1
30HP - Liner Stock Pump
Feeder - Unit Heaters
3HP - North Liner Agitator
3HP - South Liner Agitator
3HP - Hydrafiner Inlet Valve
40HP - Liner Agitator Pump
40HP - Liner Dump Agitator Pump
7½HP - Cyclay Chest Transfer Valve
3HP - Hydrafiner Discharge Valve
1HP - South Liner Chest Agitator Valve
1HP - North Liner Chest Agitator Valve
1HP - Liner Hydrapulper Outlet Valve
Liner Cabinet
Filler Hydrapulper
Filler Dump Chest Agitator
Future
Future Hydrafiner
Filler Jordan No.1
Filler white water Pump
Future
Future
137.5 KVA Lighting Transformer
Paper Machine MG Set
Filler Jordan No.2
Future
Future
Future
Drum Roll Vacuum Pump
Filler Jordan No.3
Future
Liner Jordan No.1
Liner Jordan No.2
Liner Hydrapulper
Liner Hydrafiner
Liner Hydrapulper
Boiler Room
Box Factory
Winder MG Set
Broke Beater
Corrugating
480 volt
1000 KVA Transformer No.1
1000 KVA Transformer No.2
1000 KVA Transformer No.3
Metering Pole & CTs
Bus
Steaming Line
4160 - 3PH - 60 CYC.
Mill Bus
To Mill No.2
To Mill No.2
600 KVA Transformer
1000 KVA Transformer
Mill No.2
480 volt Bus

With Electrical Distribution



Defibered by Hydrapulper . . .



Refined by Hydrafiner . . .

Controlled from central panel

R. C. BERGER

Application Engineer
(Cleveland Office)
General Electric Company

Why Centralized Control?

ECONOMY. Installation cost is less; control centers are factory assembled and tested before shipment

SAFETY. Control centers are safer because there are no exposed bus bars or wiring

MAINTENANCE. Centralized control promotes preventive maintenance and decreases the possibility of shutdowns

OPERATION. Central control panels permit equipment operations to be more easily supervised

RESPONSIBILITY. Electrical manufacture is responsible for correct functioning of centralized control systems

▶▶▶ ONE PART OF the expansion program recently completed by the Fairfield Paper and Container Company (Baltimore, Ohio) was the installation of a new electrical distribution system that serves the new cylinder board mill as well as the other board manufacturing and converting operations with which the new mill is integrated. *(A descriptive, illustrated article on the new board mill appeared in* THE PAPER INDUSTRY AND PAPER WORLD, *pages 196 to 201, May, 1949.)*

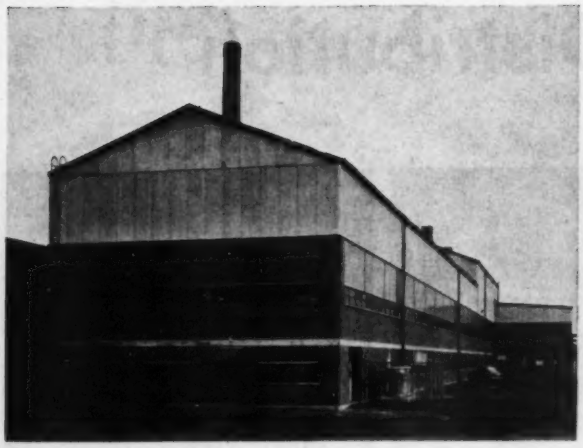
This installation not only modernized the electrical distribution system to provide adequate interrupting capacity in the event of low impedance fault in the system, but completely co-ordinated the electrical distribution with the new mill's process control operations.

Power distribution is as important to a paper mill as the circulation system is to the human body. Since the entire mill operation depends on a power distribution system, serious consideration must be given to maintaining an adequate distribution system, particularly when a momentary loss in power may mean the loss of several hours of production. Compared with the cost of papermaking machinery and the new mill building, the cost of an adequate power distribution system is comparatively small, and it is most certainly economically justified strictly as insurance in protecting an initial investment, not to mention its prime function of distributing electrical energy.

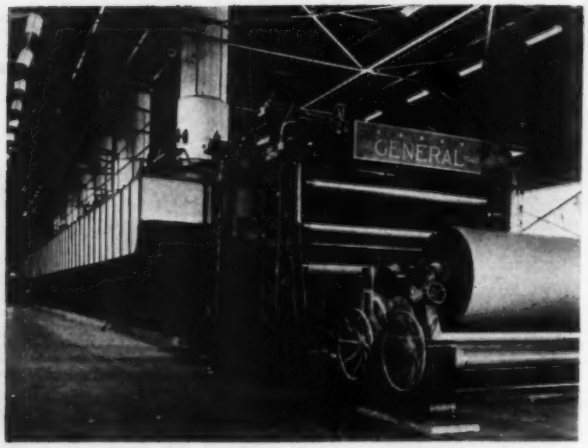
Preventing Short Circuit Damage

Naturally, it is impossible to predict when and where a short circuit may occur, but it is possible to provide "watch dogs" in the form of circuit breakers with adequate interrupting capacity and fuses where applicable, for clearing these low impedance faults, if and when they occur. When an interrupting device is inadequate and fails to clear a fault, a condition equivalent to a short circuit occurs within the device. This condition releases a tremendous amount of uncontrolled energy which may cause a violent explosion, endangering life and property in its near vicinity. Adequate interrupting devices clear these faults before they have a chance to cause damage. At the same time, they clear only that circuit where the fault lies, rather than depending on some "backup protection" in which case an entire section or perhaps the entire mill may be shut down.

Before completing the design and before specifying the circuit breakers to be used on the Fairfield distribution system, a complete short-circuit study was made of the existing system and the anticipated future system. These short-circuit studies determined the maximum value of fault current that could be expected at various points in the system. The results of these studies then determined the most economical



Fairfield's new board mill (built by the Austin Co.)



The General—new cylinder board machine (Black-Clawson)

arrangement and, at the same time, determined the selection of the circuit breakers.

Electrical Distribution

The schematic diagram shows in detail the new primary and secondary distribution system which is now in operation at this plant. The results of the short-circuit study, together with the distribution of loads, dictated that the popular low-cost secondary selective system would be the most practical. This system not only provides adequate short-circuit protection but it also provides insurance against complete shutdown in the event of failure of any one transformer or its primary feeder cable. The tie breaker, which is normally open between the secondaries of a pair of transformers, provides an alternate power source should either transformer be de-energized for any reason. This permits operation of the essential loads and keeps the mill running at a somewhat reduced capacity.

Purchased Power

Approximately 85 per cent of the power consumed by the mill is purchased from the local utility. The balance is generated by a 1000-kv-a, 480-volt, 3-phase, 60-cycle, steam engine-driven generator. The utility service comes to the mill at the voltage level of 4160 volts, and this 3-phase, 60-cycle power is handled by five kv metal-clad switchgear consisting of one incoming line breaker and four feeder breakers of the magna-blast type, each rated at 100,000-kv-a interrupting capacity. Two of the feeders serve the new mill and two serve the old mill, as shown in the diagram.

It is not practical for this company to synchronize its generator with the local utility. As noted in the diagram, the primary feeder breaker on the extreme right serves two transformer loads, a 450-kv-a bank and a 600-kv-a bank. Furthermore, the 600-kv-a bank is connected to the 1000-kv-a generator bus through an air circuit breaker. In order to prevent a mistake, the primary feeder breaker is key-interlocked with the generator breaker making it impossible to connect the generator to the utility. Under normal operating conditions, the 1000-kv-a generator feeds the loads that are connected to the old generator bus, plus the load on the 450-kv-a transformer bank by first transforming from a generated voltage of 480 volts to 4160 volts through the 600-kv-a transformer bank and then transforming back to 480 volts through the 450-kv-a transformer bank. The normal load on the power house bus is 600-kv-a which dictates the size of the transformer connected to the power house bus because in the event of failure to the 1000-kv-a generator, the entire mill can be energized from the utility by first opening the generator breaker and then closing the primary feeder breaker. Similarly, on Sunday, when the generator is not running, the entire mill may be energized from the utility.

The new mill is served by the two pairs of 1000-kv-a, 3-phase transformers and it is this apparatus together with the five *Cabinetrol* (registered trademark for General Electric Co.) units that are connected to the secondary 480-volt buses that are co-ordinated with the process control. The transformers provide a source of 480-volt power for utilization in driving the various motor loads. The transformer secondary breakers and the tie breakers are designed to interrupt a maximum of 50,000 asymmetrical amperes of fault current. The large motors are fed by individual air circuit breakers in cascade, each designed to interrupt fault current up to a maximum of 25,000 asymmetrical amperes. As indicated in the diagram, the large motors include the main drive motor on the paper machine motor generator set, the jordan motors, the Hydrapulper motors, the Hydrafiner motor, the large vacuum pumps, and the large stock pumps. In general, all motors 60 hp and larger fall into the class where each motor is served by an individual air circuit breaker ahead of the motor starter.

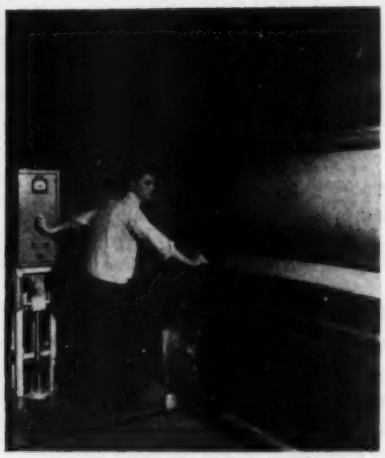
As mentioned previously, five of these secondary feeder breakers are connected to grouped control units, which may be described as a group of metal-enclosed motor starters for distributing electrical power to a group of motors. Each of the starters is furnished with a fusible disconnect switch and when used in combination with the magnetic switch, they are designed to interrupt 50,000 amperes of asymmetrical fault current. In addition to protecting the system, the grouped control equipment is used for co-ordinating the operation of the new stock preparation facilities and the paper machine auxiliaries, rather than adhering to an old-fashioned piecemeal mixture of motor starters, feeder circuit breakers, and instrument panels.

Each control center is designed for a particular operation, and, in this instance, one center controls the filler stock preparation system, another the liner stock preparation system, while three other centers control the paper machine auxiliaries, one for the dry end of the machine and two for the wet end.

Grouped Control Units

In general, the grouped control system will handle the smallest motor in the mill on up to and including 50 hp. Not only do they make up a co-ordinat-

Finger-tip control for wet end



Operating the Cameron rewinder

ed grouping of motor starters, but they also make up a complete co-ordinated control which is not limited to the control of the starters physically located within the unit itself but rather all motors identified with a particular process.

A typical example of one of the five grouped control units in the new mill is used to control Hydrapulper and Hydrafiner operations. Here the panel layout includes a complete array of process control and instrumentation for the liner stock system. Each motor whose starter is physically located within the control unit is equipped with a fusible disconnect switch, a magnetic switch, a START-STOP pushbutton station and red and green indicating lights. The indicating lights serve as a visual indication of the operation conditions.

Moreover, some of the large motors such as the 200-hp Hydrapulper and the 350-hp Hydrafiner are controlled from the panel even though their starters are remotely mounted in the near vicinity of the motor itself, which in these two instances is one floor below the operating floor.

Co-ordinated Control

Since the entire board making process is continuous from the start until the sheet is wound up on the reel, it is desirable to extend this co-ordination from one process to another. This makes co-ordination between the grouped control units desirable and examples of this are the push buttons on the liner grouped control for controlling the fresh water pump motors and the white water pump motors whose starters are physically located in machine room grouped control No. 1 and No. 2 respectively.

Since there is a definite relation between motor amperes and time and their combined effect on the pulping and refining processes, it is, therefore, desirable to have a record of this load. For this reason, recording ammeters are furnished on the front of the control panel for indicating and recording the load carried by the Hydrapulper and the Hydrafiner.

Since water is the common carrier during the stock preparation process, the flow of stock and water must be controlled by valves. To make the job easier for the operator, motors have been applied to the various stock valves and by means of pushbuttons the operator may control the flow of stock and water from one central control point. Indicating lights again are used to show the position of the valves and by "reading the lights" it is possible to tell at a glance just what is happening.

Aids Operation

Co-ordination again comes into the picture, for, as well may be imagined, it could be possible to push the wrong button. However, this has been taken care of in that the dependent motor-operated valves are interlocked with the independent motor-operated valves. For example, the Hydrafiner inlet valve is interlocked with the Hydrafiner discharge valve and this relieves the operator of the responsibility of operating the inlet valve, because the position of the inlet valve is determined automatically by the position of the discharge valve.

Remote and Local Control

One final benefit from co-ordinated process control comes from the fact that all motors not located on the operating floor are furnished with both local and remote pushbutton stations as a matter of convenience. The remote buttons are located on the motor control center while the local buttons are located in the near vicinity of the motor itself.

This scheme of complete co-ordination is carried out in the other five grouped control units. The liner stock unit was merely an example of what can be done with co-ordination. For example, the oiling system which is incorporated in the grouped control is complete with low pressure alarm signals and hand or automatic stand-by control. Reversing controllers for calender reversing, calender lifts, and felt stretchers are available in grouped control units. In fact, there are no limitations on what you can do with a co-ordinated control scheme of this nature. If the control scheme is feasible, it can be co-ordinated in a factory-assembled unit which unquestionably reduces the installed cost of the system.

In general, there are many advantages of centralized control over a piecemeal system.

First, centralized control is more economical because, as mentioned previously, the installed cost is less. This arises from the fact that control centers are easier to install because they are completely co-ordinated, assembled, and tested at the factory. After the unit is received in the field, it becomes a simple proposition to connect the incoming power line to the bus and connect the outgoing power leads to the motor. In the case of co-ordination between control centers, it is necessary to connect control leads between the units affected by the co-ordination.

Second, control centers are safer because there are no exposed bus bars or wiring.

Third, there will be less maintenance cost because centralized control promotes preventive maintenance and shutdowns are less likely to occur.

Fourth, there is less supervision required because of the centralized control functions. The mill superintendent can check process operation at a glance.

Finally, centralized control places unit responsibilitiy on the electrical manufacturer, for the over-all functions of the control. This, in itself, warrants the installation.

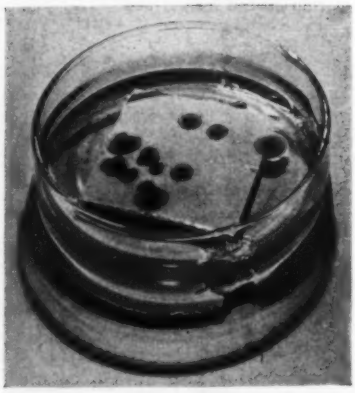
Summarizing, therefore, it can be said that by analyzing and co-ordinating a power distribution system with the process control operations from the very beginning, it is possible to design an over-all system that will provide, (1) adequate protection of life and property, (2) an uninterrupted flow of vital electrical power insofar as it is economically justified, and (3) a complete co-ordination of mill control functions with unit responsibility on the shoulders of the electrical manufacturer and all at a lower installed cost.

Practical Slime Control

Where is a paper mill that has no slime problem? While some operations are more severely affected than others, each mill must exercise some form of slime control.

Fundamental aspects of this problem were outlined last month in an article by B. F. Shema, Institute of Paper Chemistry. Presentation continues this month with articles by several companies whose products and services are utilized by the paper industry to combat the microorganisms responsible for slime occurrence. More data will be published subsequently in an effort to clarify and bring together the important facts required for an intelligent approach to the slime problem.

Sample of pulp slurry which has been plated for fungi count and identification



Fungi growth on paperboard results from inadequate control. (Photos courtesy National Aluminate Corp.)

Chemical Toxicants for Slime

WILLIAM N. McKEE
W. A. Cleary Corporation

▶▶▶ PAPER MILLS are normally operated under conditions which can permit the growth of bacteria and other microorganisms in the water systems. Certain of these form deposits on the surfaces of tanks and inner walls of pipes or form gelatinous globules suspended in the pulp. These slime-forming organisms must be kept under control if a mill is to be operated at high efficiency.

Because of large pulp losses in open systems and the need to conserve water, the practice of recycling about 75 per cent of the white water from paper machines has become almost standard practice in recent years. A higher proportion recycled, results in excessive buildup in the system of chemicals such as alum and soda, and a lower proportion means more losses of fines into the sewer. Recycling increases the slime problem very greatly, since bacterial growths in any part of the system quickly contaminate all parts instead of being swept through.

Slime Contamination

There are a number of sources of slime contamination which normally affect a paper mill. Fresh water in a mill may contain raw sewage and other contaminants. Groundwood pulp carries spores which develop under mill conditions into bacteria and fungus growths. Air born organisms contaminate stored pulp and open tankage. Waste paper stocks contain glue, food waste, and other materials that rot during storage providing a plentiful supply of organisms to harass the papermaker.

Fresh water contamination can usually be kept under control by the use of chlorine. Chlorination equipment is expensive, but cost of operation is low. Chlorinated fresh water is advantageous even though other toxicants are required in the system, since it usually reduces the amount of such other toxicants required, and thus decreases the cost of slime control. Chlorine will not destroy the organisms in pulp made from groundwood or mixed waste paper since such pulp absorbs chlorine more readily than the organisms. Some mills have been successful in controlling slime with chlorine where only sulphate or bleached rag pulps are used. These mills chlorinate their fresh water and also filter and chlorinate their recycled white water and report that their chemical cost, including neutralization with ammonia, is around 5 cents per ton of paper. Occasionally other types of mills use this system, but the cost is much higher and the control of slime is often inadequate.

Slime growths are affected by the temperature of the water. Unless unusual organisms have entered the system, there will be no growth except between 60 and 118 Fahr. Near either end of this range, growth will be slow. Maximum slime is produced around 85 degrees to 90 degrees. Some northern and Canadian mills have been able to eliminate slime treatment from about December 1 to about June 1 each year by keeping their operating temperatures below 60 degrees. Others utilize heat from their groundwood operation plus some waste steam to maintain high enough temperatures so that slime does not form. However, in the latter cases more than enough fuel could probably be saved by running the waste steam back into the boiler feed water to pay for chemical slime control, so that, unless other advantages, such as additional freeness of the pulp, are obtained, this is not an economical practice.

Slime can be kept under control by regularly cleaning out the system. Depending on conditions, such clean ups in recycled systems must be made at periods ranging from twice a week to once every three weeks. They consist in

washing or scraping down beaters, screens, and head boxes and flushing through lines with high pressure hose or hydraulic cleaners. Strong alkalies can be used to help loosen slime deposits. Such treatments require shutting down the equipment with resultant loss of production, or, if made during regular week-end shutdowns, additional labor cost. Where slime conditions are extremely light, adequate control may be obtained in this fashion. Usually there are enough inaccessible parts of the system so that really thorough clean ups are not possible. In any case, chemical slime control can give better results and at substantial dollar savings. Of course, occasional clean ups are desirable even with good chemical control, because there will always be some debris in the system. One mill reduced weekly cleanup time from about 8 hours to about 45 minutes on installing chemical control.

Chemical Toxicants

The addition of a chemical slime control agent is now the practice in about 75 per cent of American paper mills. There are hundreds of brands of these chemicals being offered to the trade, but those that have proven effective at a reasonable cost per ton fall into two general types. One type consists of homologues and derivatives of phenol such as sodium pentachlorphenate. The other type consists of organo-mercurial compounds such as phenyl mercuric acetate. A few products are combinations of the two types.

Of the phenolic materials the cheapest and most effective are the alkyl phenols. However, since the outbreak of the European war in 1939, these have been in short supply and there has been little or no effort to prepare them in forms suitable for slime control or to sell them to paper mills. On the other hand, some chemical concerns were throwing away large quantities of various chlorinated phenols obtained as by-products from the manufacture of phenol. Such products are too odorous to be sold to the disinfectant trade, but it was found that with intensive sales effort, large quanties could be sold the paper manufacturers. Today, these products are widely used as slime control agents. The most popular form is sodium pentachlorphenate. Complete elimination of slime would be expensive with this product, but a dosage amounting to about 10 cents per ton inhibits slime sufficiently so that mills can greatly extend the periods between clean ups.

The organo-mercurials comprise a variety of products of varying effectiveness. The most powerful and most widely used of these are the phenyl mercuric salts such as phenyl mercuric acetate. The phenyl mercuric ion is the active ingredient in these and is effective in great dilutions for all types of micro-organisms. Ethyl mercuric phosphate has a comparable toxicity to micro-organisms, but is considered less desirable because it has an odor and produces poisonous fumes. Pyridyl mercuric acetate acts similarly to the phenyl mercuric salts, but slightly larger quantities are needed for bacterial control, and it offers relatively poor control of most molds and other types of fungi.

Phenyl mercuric acetate at dosages around 8 cents per ton of paper generally permits excellent control of slime in systems where the water is recycled. It is available in various forms. Several firms offer it in dry powder form in envelopes to be dropped in the beater. These have proved effective in mills making fine papers where a beater period of 12 hours or more is used, but the material is so slowly dissolved that in most operations it is inefficient. Entrainment in the pulp seems to account for most of the material in such cases. In some instances local concentrations may make the paper dangerous to handle since this toxicant is sufficiently powerful to burn on direct contact. The same considerations apply to the use of other dry mercurial compounds.

The mercurials can be predissolved before putting them in the system. This is a difficult operation and a better answer is afforded in water solutions marketed in concentrated form embodying a mercurial in an organic complex. These cost no more than the dry salts, and have the two advantages that they permit efficient use of the mercurial and that addition to the system may be made with automatic equipment. Before buying such a product, it is well to dilute a little with the mill water to see that the chemical is not thrown out of solution by any dissolved salts in the mill water. An ounce or so of the product poured slowly into a half a glass of water will show this.

There are several combination products available incorporating both chlorinated phenols and mercurials. With some of these, excellent results can be obtained at about 25 to 30 cents per ton of paper.

Application

Methods of applying chemical slime control agents differ in various mills. With chlorinated phenols and some of the combination products, best results are obtained with "slug" feeding. A relatively high dosage is put in for a short period at regular intervals. This may be applied once per day, every four hours, or at other intervals. With the mercurials, especially in systems that recycle their water, best results are usually obtained with continuous feeding. With slug feeding, addition should be made at the point where slime growth is most rapid, but with continuous feeding into recycling systems there is not much advantage in one spot over another. Places of addition used by various mills are the white water just beyond the overflow, the stock storage tank, and the fresh water. Decision as to where the toxicant should be added can be governed by consideration of where it is mechanically convenient to place the equipment used to control the addition.

All chemical toxicants are dangerous to handle so it is best to use automatic equipment to avoid accidents.

Food Papers

In mills that make paper to be used in direct contact with foods there are certain special considerations which must be kept in mind.

Odorous materials must be kept out of the paper. Materials such as sodium pentachlorphenate release the corresponding phenol when acidified and such phenols have a strong odor. Moreover, certain foods have a tendency to pick up such odors selectively. For this reason the phenolic materials should never be "slug" fed in food paper mills, and in any case not over about ½ pound of active phenolic material per ton of paper should be used.

Mercurials may be used with certain precautions. It is necessary to be sure that the paper does not carry a dangerous concentration of mercury. Normally slime control with an organo-mercurial will result in a mercury content of about 1/10 part per million, while a mercury content of 10 parts per million would still be well on the safe side. This 100:1 safety ratio would seem to be ample. However, the forms of organo-mercurials that can be entrained by the pulp can cause very high concentrations in small bits of paper and so must be avoided. Mercurials that are put into the system as dry powders or that precipitate on dilution can be entrained unless extraordinary conditions are present. A very long beater period, or a series of efficient refiners can eliminate the hazard of such materials. Continuous feeding with a stable solution of a mercurial is the safest method.

The Food and Drug Administration considers it the responsibility of a food container manufacturer to assure himself that the use of his containers will not result in the contamination of food. They do not prescribe materials which they consider satisfactory nor do they recommend methods of addition. However, there are mills using mercurials with proper precautions in which Food

and Drug inspectors have repeatedly picked up samples of paper and no objections have been raised.

Food paper manufacturers should avoid the use of mystery chemicals. They should know the nature and amount of the active ingredients in their slimicides and avoid materials for which this information is not available. They are responsible for the safety of all materials they use. Moreover, federal laws provide severe penalties for interstate shipment of bactericides and fungicides not labeled with the common names and the percentage of active ingredients.

Phenyl Mercuric Acetate

PMAS is the trade name used by the W. A. Cleary Corporation for a clear water solution containing 10 per cent phenyl mercuric acetate in an organic complex. It is a stable solution and may be stored indefinitely. It does not precipitate on dilution. It is compatible with chemicals normally present in pulp and paper mill systems. It may be used under acid, neutral, or alkaline conditions.

This solution can be handled in steel, steel alloys, glass, rubber, and plastic equipment. The concentrated material should not be used in contact with copper, zinc, or their alloys since the mercurial will amalgamate with and embrittle copper, brass, and bronze and will dissolve zinc and white metal castings. A dilution of about 1 to 1000 becomes safe with these metals, whereas the usual paper mill dosage amounts to about 1 to 800,000.

If PMAS is spilled on the hands, no injury will result if it is rinsed off with water immediately. However, if the material is left on the skin, painful blisters may develop a few hours later. A dilution of at least 1 to 100 should be used in any application where the solution is expected to come in contact with a workman's hands.

The selection of phenyl mercuric acetate as the active material in PMAS is based on the fact that this chemical has a high ratio between the dosage that is harmful to warm blooded animals and that which is effective against bacteria, yeasts, molds, and other types of fungi. Moreover, this material is less selective in its action on microorganisms than are other toxicants. That, is there are few organisms that persist with the standard dosages of this toxicant.

In solution phenyl mercuric acetate is ionized and the toxicant is actually the phenyl mercuric ion. Identical results can be obtained with equivalent amounts of solutions of phenyl mercuric nitrate, borate, lactate, chloride, or hydroxide. The phenyl mercuric ion like other cations is not adsorbed by cellulose as are anions such as the chlorphenate ions. This is one reason why PMAS persists in the mill system and is effective at very low dosages.

PMAS has no effect on the paper and will not cause odors that can be picked up by foods or other materials packaged in the paper.

PMAS is shipped in steel drums and is normally applied by automatic equipment directly from the drum. The intake hose of a Wallace and Tiernan chemical feeder type HE can be dropped through the small bung hole. If a Fischer and Porter Flowrator is used, pipe connections are attached to the small bung hole, the drum is mounted horizontally, and a gravity flow is used through the rotameter to the point of application. If manual handling is desired, a faucet is inserted in the bung hole and a container such as a six ounce bottle is used to measure out the dosage at regular intervals.

In most applications the dosage can be computed from the formula "eight ounces reduced by the percentage of recycled water." Thus for a system recycling 75 per cent of its water, a two ounce dosage (or about 7c per ton) would normally be used. This formula holds very well for systems that are clean and for continuous feeding or frequent slug feeding methods of application. In systems that are dirty to start with it has sometimes been necessary to use a double or even quadruple dosage for as much as six or eight weeks to remove concentrations of slime that keep reinfecting the mill. Eventually the dosage can be cut to this formula. If slug feeding at longer intervals, such as once per day, is used, the dosage required is apt to be about four times this amount.

The dosage is the same whether the stock is groundwood, sulphite, sulphate, rag, or mixed wastepaper.

The W. A. Cleary Corporation maintains bacteriological and chemical laboratory facilities to handle any extraordinary problems that may arise. Fundamentally, the company's position is that of a basic manufacturer of industrial chemicals.

Regular Cleaning Prevents Slime Troubles

ROBERT KIPP
Oakite Products, Inc.

▶▶▶ FROM THE STOCK PILE to the paper machine, slime eats its costly way into paper production profits. The consequent losses per ton of finished product are reported to be heavy.

By every avenue of infiltration, bacteria slips through. Then it really goes to work: fouls up stock preparation equipment, clogs wire mesh, mats up felt fibers and often causes vacuum readings to increase.

Obviously, downtime following in the wake of a slime condition can upset any production schedule. At its worst, slime not only causes a substantial loss through downtime and tonnage loss, but also effects a further loss through quality degradation and machine depreciation.

Good Housekeeping

One of the best barriers yet devised is clean equipment. Outside of equipment changes, which effectively streamline the flow of pulp and keep slime-causing bacteria from settling and developing, regularly scheduled good housekeeping still is one way to keep slime from doing its harmful work.

However, there is a great difference between the proposed idea of good housekeeping and the actual cleaning that is implied. Today, good housekeeping is not all scrub and sweat. It is really a way of bringing chemicals into play to remove slime, and to prevent its widespread growth in papermaking equipment.

Most widely used of the Oakite materials for slime removal work is Composition No. 22. This alkaline material has proved itself to be effective and thorough in the removal of slime deposits. It is a medium duty material with high detergent value, that is completely safe on equipment. A balanced cleaning material, it combines efficient wetting, penetrating, and slime dispersing properties.

Whether treated or untreated water is used, the presence of slime is en-

countered to some degree. Since slime is so persistent and pervasive, frequent and effective cleaning of piping, screen plates, chests, head boxes, beaters and save-alls, and other stock preparation equipment is vital. One widely-used method comprises the following technique.

Methods

A solution of 2 to 4 ounces of Oakite Composition No. 22 to the gallon of water is made up in the beater by dissolving the cleaner into working solution with live steam or equivalent. This concentration is usually adequate for slime conditions most often encountered. Depending on the deposits present, foaming may occur; but it will soon recede without causing harm.

The solution is now ready for work in the beater where it is manually brushed on inaccessible areas for slime removal there. From the beater, the solution is dropped to the stock chest which is manually brushed for effective slime removal. Next the solution goes through the piping to the jordan and jordan chest; then to the head box. Provision should be made, if possible, to keep the cleaning solution at about 120 Fahr. by re-heating it along the line of cleaning.

The length of cleaning time depends on the thickness and tenacity of the deposits. The cleaning solution should be applied until all slime is removed. Lines are simultaneously cleaned when solution is circulated from one piece of equipment to the next. When all plates, lines, tiled chest surfaces, and piping have been thoroughly cleaned, the solution is drained at the head box. The entire system should then be hose-rinsed with water.

In many cases, where lithcoated lines and equipment are encountered, Oakite Compound No. 84A may be used in much the same manner as previously described. This material is acidic in nature but completely safe to lith-coated surfaces in slime removal procedures. It is efficient and speedy in the elimination of slime, foreign matter, and insoluble hydroxides which may be present in the lines.

Regular Cleaning

It has been proved that the proper cleaning materials and methods make it possible to maintain equipment in a clean condition and thus help to keep slime out. It takes considerable planning to set up a competent cleaning program that can be carried out at a minimum downtime. But it is a fact that a well rounded cleaning program faithfully carried out helps keep surfaces free of the deposits which adversely affect the end product.

Slime Treatment Service

HARVEY E. BERG

National Aluminate Corporation

▶▶▶ SLIME DEPOSITS that form on pulp and paper mill equipment during the manufacturing process may, and usually do, cause considerable trouble. These slime deposits are not part of the organism but are the products of these organisms. Before the organisms themselves can be killed, their protective sheath or surrounding slime must be penetrated so that contact with the organism can be made by the toxicant. If the treatment does not contain dispersants, or does not have the ability to penetrate to the submerged organisms, the treatment is ineffective.

Phenolic derivatives such as phenylphenate, tri-, tetra-, and penta-chlorophenates are used extensively for slime control in the paper industry and are the basis of most Nalco slimicides. Each derivative has a specific toxicity toward different types of organisms. The advantages of the phenolic derivatives are that they are effective in a mill system because, chemically, they are relatively stable. Mercurials of the organic type also are used because of the high specificity of the mercurials to bacteria, particularly the nonspore bacteria and because of the rapidity of the action of the mercury salt.

Chemicals, including the toxicants, dispersants, solubilizers, and stabilizers, composing the slimicide are compressed into one-pound dustless ball briquettes approximately 3 inches in diameter for ease and safety in handling and feeding. Thus, weighing devices are not necessary and spillage is eliminated. In manufacture, the solubility rate of the briquettes is considered, and careful control of this phase is exercised by the manufacturer's laboratory, which also exercises quality control of the raw materials used. The solubility rate of the slimicide is important since it is a means of assuring against inadvertent excessively high localized concentration of chemical in a pulp system which conceivably could be deleterious to the product.

Chlorophenates

The chlorophenates are alkaline and are not corrosive to the equipment in a mill system in the dosages normally used and even in the concentration which would conceivably occur. Considerable concern has been expressed from which has emanated much discussion over the possible embrittling effect of mercurials on copper and copper alloy equipment in the mill system. Probably this has been overemphasized, but since such action can occur, and its occurrence has been reported from the field, prevention and elimination should be considered. Nalco has investigated this action and is continuing to do so. It has been found that this action only can occur with high localized concentrations of mercury salt. Here again the controlled solubility of the briquettes is favorable to the control and prevention of embrittlement since it assures against high localized concentrations by inadvertent and uncontrolled feed. The dispersing, stabilizing, and solubilizing chemicals also assist in overcoming this problem. Nevertheless, Nalco believes the problem of sufficient importance to incorporate a material in the formula to assist in assuring against metallic attack in normal chemical usage.

Chemicals that are effective in controlling slime in a paper mill system are more or less toxic to humans. In the case of chlorophenates, the toxicity is so low that when used correctly for slime control, and when precautions are taken to assure against high localized concentrations of chemicals, we do not believe there is toxic danger from this source. As a matter of fact, it is not unusual to find phenols in paper when none have been used in the paper process. The source of phenols in these cases may have been the wood pulp itself. The mercury salts on the other hand are considerably more toxic and, therefore, more caution is observed in recommending mercury formulas for paper which is to be used for food packaging.

Mill Requirements

Type of treatment necessary depends on the type and the degree of slime to be controlled in a mill system. Nalco has a number of formulas (actually eight in number) which can be used either separately or in combinations depending on the system requirements. Some mills, or some particular points in a mill system, may require more dispersing action than may be necessary for general control, and this requirement can be compensated for by selection of treatment. By varying the combinations of formulas, a flexible program can be maintained consistently.

Amount or dosage of treatment necessary for slime control is a varying and relative figure. For complete slime control, this figure may vary from week to week depending on conditions such as type and amount of slime, type of furnish, season, degree of pollution and attention paid by the mill to sanitation. Complete control of slime formation

requires a total of so much slime treatment, sanitation control, and human effort. This last should not be discounted because the successful slime control programs are those where the addition of chemical or slimicide is considered an aid to *good housekeeping*, rather than the fundamental operation. For the total to remain the same, a reduction of any one of the three points mentioned means a necessary increase in one of the others or the sum total suffers. The cost of chemical for slime control may be as low as 7 cents per ton; in some cases, a cost as high as 75 cents per ton has been justified. The average cost is approximately 15 cents per ton of paper produced.

Summarizing briefly, the choice of treatment depends on mill conditions, microbiological analyses and experience gained from treatment used in other similar mills, but in general the following described applications of Nalco slime treatment will apply:

Nalco 21—Is a highly solubilized saturated chlorophenate and is a general formula in mills where slime counts are low and in mills where a greater than normal dispersing action on accumulated deposits is required.

Nalco 21B—Is an all purpose formula with good stability and dispersive action and contains some unsaturated as well as saturated chlorophenate.

Nalco 21M—Is a high percentage stabilized saturated chlorophenate and is specific for spore bacteria and in addition is very effective for control of molds and yeast-like microorganisms.

Nalco 21S—Is a high percentage mixture of saturated and unsaturated chlorophenate derivatives which is effective on the more chemically resistant nonspore bacteria and is specific for yeast-like growths.

Nalco 23—Is Nalco 21 with a synergist added and is used in mills having average and uniform potential slime conditions.

Nalco 22—Is a highly solubilized and reactive organic mercurial which is specific for most nonspore bacteria and is quick in its action.

Nalco 22D—Is a combination of Nalco 22 and Nalco 21S and controls practically all types of microorganisms. This formula should be used with discretion and only in cases where potential slime formation is severe yet fairly well stabilized because it is a fixed formula and as such lacks the flexibility obtained when combinations of treatment are used. For example, in most cases a combination of Nalco 22 with Nalco 21S fed separately provides better control than the Nalco 22D used alone. The advantage of the Nalco 22D is its convenience.

Various and different types of organisms may grow in various parts of a mill system. Since chemicals have a higher specificity for some organisms than they do for others, it is a distinct advantage to be able to feed a chemical conveniently into the mill system at the point inoculation or incubation of organisms may occur. Use of briquettes can accomplish this by simple by-pass feeders. If it is desired to feed chemical at a point under pressure, a pressure-type feeder can be used, or if a feed into a chest is desired, a gravity or open feeder can be utilized. By selecting a properly sized feeder and taking into consideration the water temperature and the recharge interval of the feeder, uniform and consistent feed can be maintained to plus or minus 12.5 per cent. This means that if a dosage of 8 ppm is desired, feed can be maintained between 7 to 9 ppm actual when proper selection of the feeder is made. Feeders of sizes capable of taking care of practically any desired application are available.

The Nalco system for slime control in pulp and paper mills is from necessity very complete, and the average mill should adopt the entire system to get optimum results at the lowest cost.

The adoption of this system for a paper mill can be compared to the control of an epidemic in a hospital. When a hospital has an outbreak of some contagious disease, the health department simply does not buy sterilizing or disinfecting chemicals and spray them around. Everything is cleaned to perfection, garbage collection and waste disposal are inspected; attendants are checked, and every improvement is thought of that will eliminate the sources of trouble and the factors that spread infection. The same applies to a paper mill.

The Nalco system, therefore, comprises the following:

Engineering survey comprising a flow diagram, data on mill equipment, data on chemical furnish used, water tests, water consumption rates, points and quantities of white water sewage, system temperatures, *p*H, and description of operation of the mill.

Microbiological survey comprising collection of samples at proper points, analyses, to slime conditions as found in the mill.

Chemical survey comprising chemical analyses of deposits, white water, and what other chemical investigation is required.

Application and selection of treatment. Mill operators are instructed relative to dosages of chemicals, methods of feeding and plant control. Clean-up procedures are developed for each particular mill.

Service. Regular personal calls by field engineers are maintained. A definite program is developed to fit changing conditions that might occur due to variations in process, water supplies or raw materials. Samples are submitted regularly to company laboratories for check surveys to make certain adequate control is maintained at all times.

The mill surveys are made by competent service engineers at no charge or obligation to the mill. Continual service is provided at no extra charge with the Nalco chemicals and our extensive research and laboratory facilities are made available at all times to Nalco customers.

Two-Directional Information*

▶▶▶ EVERY GOOD EMPLOYEE communications program has a two-direction flow. It provides for listening to employees and telling them what *they* want to know, as well as telling them what *you* want them to know.

The future of our democracy may well depend on the extent to which industrial employees and their families know about, and believe in, our way of life. And no one is in a better position to tell the true story of American enterprise more effectively than the managers of enterprise themselves.

To attempt to explain to employees the workings of our economic system as a whole is a complicated and difficult task. But the job *can* be done in terms of homely illustrations taken from your own operations with which your employees are familiar.

Summarizing, here are the reasons why you as an employer, need to get on with this job:

The efficient operation of your plant depends, first of all, on the respect of the employee for the capacity and performance of management.

Employees who know where they fit in the company, why their work is important, and the ultimate uses of the products, *have better work attitudes.*

Greater satisfaction of the individual employee with his job and his employer stems from a thorough knowledge of what's going on in the company.

Work interruptions are often caused by misunderstandings. A good communications program can *minimize the possibility of such misunderstandings.*

A good two-way information program *gives management a better understanding of what employees want* and what they're thinking.

Failure of the company to tell its story *leaves the way open for misinformation* and demoralizing rumors.

The kind of economic system we have in America depends on the wishes of its citizens. Only when the employees understand what the individual enterprise system is doing for them and feel they have a part in it, can we expect them to believe in and support it.

(*) Abridged from *Employee Communications*, published by the National Association of Manufacturers.

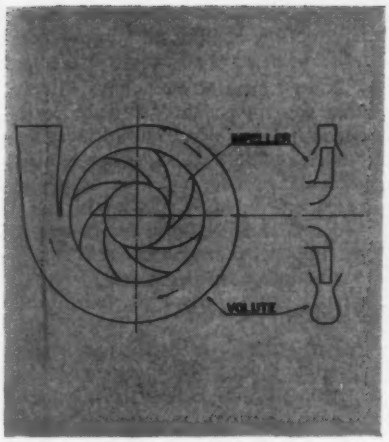


Fig. 1—Volute type casing centrifugal pump

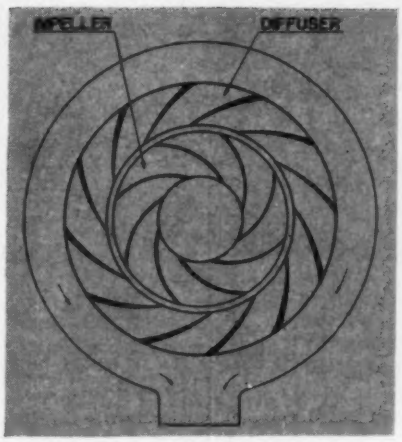


Fig. 2—Diffuser type casing centrifugal pump

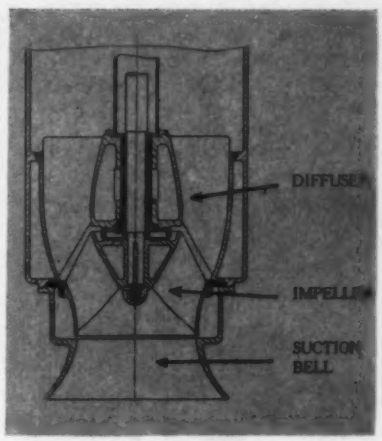


Fig. 3—Vertical propeller pump with diffusion vanes

Designs and Functions of Pump Casings

Part 2 of a series on centrifugal pumps. Problems of selection, operation, and maintenance are aided by a fundamental understanding of the design and construction of the component parts of centrifugal pumps. The authors not only describe different types of pump casings, but they tell why they are so designed.

Igor J. Karassik and Roy Carter
Application Engineers
Worthington Pump & Machinery Corporation

▶▶▶ ESSENTIAL structural elements of any centrifugal pump are the rotating element, comprised basically of a shaft and impeller and the stationary element made up of casing, stuffing boxes, and bearings. All other parts are refinements of construction, supplementing the function of these essential elements.

These articles on structural details are intended to present a thorough analysis of the component parts which, after suitable assembly, combine to make a centrifugal pump. This analysis will concern itself further with the relationship which these parts bear to each other, for the best pump is not necessarily that which is made up of the best component parts if these separate parts cannot be applied harmoniously in conjunction with each other.

Casings—Volute or Diffuser?

Besides that of containing the liquid which is being pumped, the function of the pump casing is to reduce the high velocity of the liquid discharged from the impeller and thus transform kinetic energy into pressure energy. Centrifugal pump casings can be classified into two basic groups with respect to the type of energy conversion:

(a) Volute type
(b) Diffuser or turbine type

The volute casing pump (Figure 1) obtains its name from the spiral shaped casing surrounding the impeller, whose function is to collect the liquid discharged by the impeller, and to convert velocity energy into potential energy. The volute of a centrifugal pump increases in area from the initial point until it encompasses the full 360-deg. area around the impeller and is then flared out to the final discharge opening. The wall dividing the initial section and the discharge nozzle portion of the casing is called the tongue of

Material from this article will be included in a book on centrifugal pumps now being prepared by the authors; hence, all rights to republication are reserved by the authors.

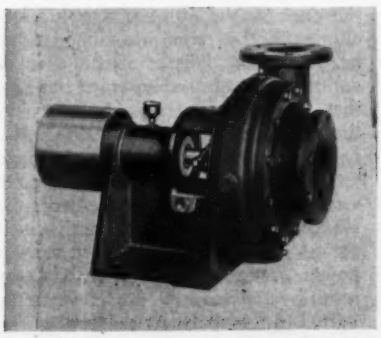


Fig. 4—Radially split casing end-suction single-stage pump with overhung impeller

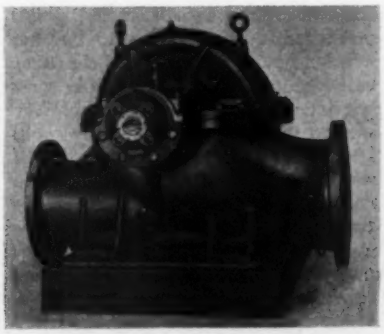


Fig. 5—Axially-split casing single-stage pump, with side suction

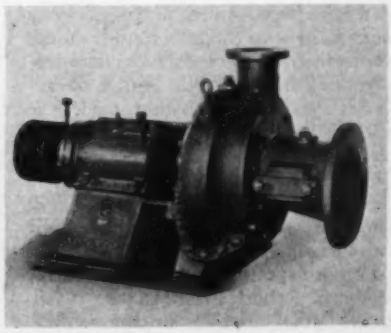


Fig. 6—End-suction pump with casing split along inclined plane through its axis

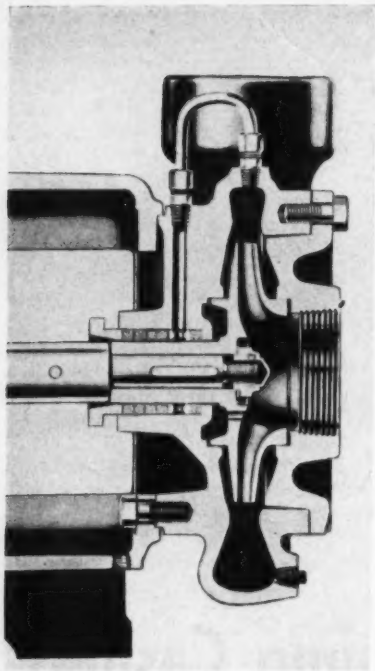


Fig. 7—End-suction pump arranged with removable suction head

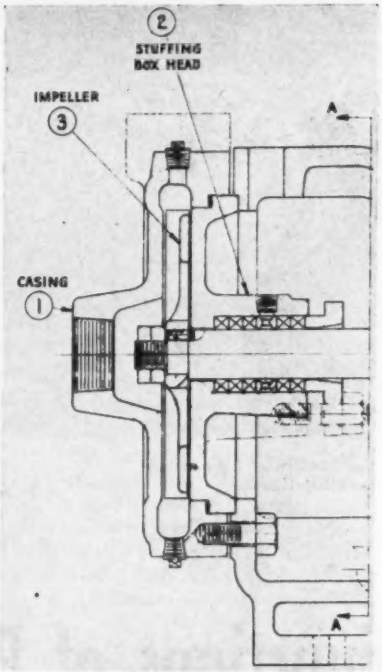


Fig. 8—End-suction pump with removable suction head

the volute. It is also sometimes called a "cut-water."

The turbine pump is so named due to its concentric casing with diffusion vanes resembling conventional water-turbine casing construction. The diffusion vanes and the concentric casing fulfill the same function as the volute casing in energy conversion.

In certain applications such as propeller pumps where axial flow impellers are used, it is not practical to use a volute casing and the impeller is, therefore, enclosed in a casing formed as a pipe. Generally, diffusion vanes are used following the impeller proper, but in certain extremely low head units, these vanes may be omitted.

Diffuser Casings

A diffuser type centrifugal pump is illustrated in Figure 2. The development of the diffuser produced an appreciable improvement in the efficiency obtainable with the rather crude volute forms then in existence. Later improvements in the hydraulic design of impellers and volute casings made the use of the diffuser of little, if any, value in increasing pump efficiency. It is, therefore, seldom applied to a single-stage volute pump, although it possesses structural as well as hydraulic advantages, which may become useful in certain specific cases. One advantage of such a construction is that it balances radial reactions on the rotor.

At the present time, except for certain high pressure multistage pump designs, the major application of diffusion vane pumps is in vertical turbine type pumps and in single-stage, low-head propeller pumps, as shown in Figure 3.

On the negative side of the ledger, the use of diffusers may introduce certain complications in connection with the hydraulic characteristics of the pump. A diffuser having a series of fixed vanes in the path of the fast-moving liquid leaving the impeller, can only meet this flow without shock at the capacity for which the pump is designed, for only at this condition does the angle of the vanes correspond to the angle at which the liquid leaves the impeller. At all other flows, the multiple vanes will cause shock and turbulence so that the pump may operate in an unstable condition.

As a matter of fact, when the flow is restricted to as low as 5 or 10 per cent of the normal capacity, these shocks and turbulences may become sufficiently severe to reduce the total head generated by the pump. As a result, the head-capacity curve of low specific speed type pumps easily could acquire a "droop" in the vicinity of shut-off capacity, rendering the pump unsuitable for satisfactory parallel operation. The foregoing should not be interpreted to indicate that a diffuser pump such as is used for high head services, such as boiler feed pumps, will always produce a drooping characteristic, but rather that the danger of such a curve is inherent with this design and that extreme care is required in the layout of the impeller and diffuser combination in order to avoid this danger.

Pump manufacturers have endeavored for a long time to stabilize the head-capacity curve of diffuser type pumps and various solutions are available to this end, solutions which are based on the selection of suitable impeller vane angles, proper curvature of the impeller blades and careful design of the diffuser passageways.

Flexibility

An additional problem arises through the use of diffusers in connection with the potential flexibility of a given centrifugal pump. It is obvious that it is desirable to obtain as much coverage from a single pump pattern as possible, so as to decrease the number of patterns comprising a complete line of pumps and to reduce the necessary number of parts to be carried in stock. In the case of a volute pump, it is possible to decrease the impeller diameter by as much as 20 per cent from its maximum value without appreciably reducing the pump efficiency through increased hydraulic losses.

On the other hand, such a decrease in impeller diameter is unthinkable in connection with diffuser type pumps, as the gap between the impeller periphery and the inlet vanes of the diffuser would become too great and the hydraulic losses would grow out of proportion. As a result, the maximum diameter impeller can be cut only from 5 to 10 per cent at the most before it becomes necessary to utilize a different diffuser pattern with a smaller inlet vane diameter.

These restrictions upon the permissible cut-down lead to a necessary increased inventory and, at the same time, limit the flexibility of constructed units since a change of conditions of service which otherwise might be met with an impeller cut-down, may require as well the acquisition of a new diffuser.

Radial Thrust

It has been mentioned earlier that the use of the diffuser type casing eliminates the radial reactions acting on the rotor. These reactions in a volute type casing arise from the fact that there is a certain unequality in the pressure distribution along the periphery of the volute because of the unsymmetrical disposition of the latter around the impeller. Thus, hydraulic reactions are set up in the pump which are of different magnitude at various points around the impeller and the resulting unbalanced force is transmitted to the shaft. At reduced capacities, the area of the volute is no longer correct for the flow and the hydraulic

reaction unbalance is magnified so that the force acting radially on the rotor may become quite marked.

Of course, the radial thrust is definitely a function of the head generated by the pump and, therefore, for single stage pumps of average size and limited pressures, its effect is negligible. As the total head generated and pump size increases, means must be employed to eliminate this radial thrust, if possible, so as not to necessitate the use of extremely large diameter pump shafts.

One means used to combat the effects of radial thrust in volute type pumps is the twin-volute construction. A twin-volute is, in effect, two half-capacity volutes, each taking the discharge from a 180-degree arc of the impeller. Of course, it must be considered that the twin-volute cannot eliminate the radial thrust of a single-stage pump entirely, since one of the volutes discharges into a straight discharge nozzle while the second discharges into the curved channel formed by the first volute. From a technical viewpoint, it could be questioned whether a twin-volute pump should be classified as a volute pump or as a two-ported diffuser.

Twin-volute design has many potential advantages, particularly in the large capacity, medium, and high head single-stage vertical pump applications, as the rib forming the second volute and separating it from the discharge waterway of the first volute adds to the strength of the casing. The twin-volute is not as well applicable in smaller sizes of pumps because of the difficulties in cleaning the casing passages in the foundry and because of the increase in wall area and the resulting increase in frictional losses.

Solid and Split Casings

In centrifugal pump nomenclature, *solid casing* implies a design in which the discharge waterways leading to the discharge nozzle are all contained in one casting or fabricated piece. In order that the impeller may be introduced into such a casing, the latter has to have at least one side open. As the sidewalls surrounding the impeller are in reality part of the casing, a solid casing, strictly speaking, cannot be used, and designs, normally called *solid casing*, are really *radially split casing* designs (See Figure 4).

By *split casing* it is implied that the casing is made of two or more parts fastened together. The term *horizontally split* was devised to indicate the casing construction usually employed with horizontal shaft double suction pumps to show that the casing was divided by a horizontal plane through the shaft centerline or axis (Figure 5).

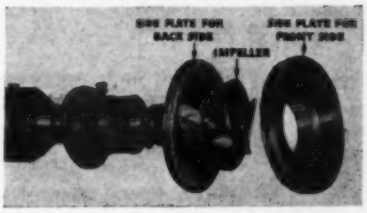


Fig. 9—Rotor and casing side-plates of paper-pulp pump handling abrasive stock

That designation was an unfortunate choice, as applications of the same design of pump for vertical use or with the nozzle position rotated confused the terminology. Many design engineers now prefer the terminology *axially split* for this type of construction. As both the suction and discharge nozzles are normally in one half of the casing, this construction permits the removal of the other half (upper half in the case of horizontal shaft pumps) for examination of the interior without disturbing the bearings or the piping.

Like its counterpart *horizontally split, vertically split* is bad terminology. It is intended to refer to a casing which is split in a plane perpendicular to the axis of rotation. The term *radially split* is now being used by some designers to designate this type construction.

In some special applications of horizontal shaft pumps, it is desirable to use a casing split along a plane passing through the pump axis but inclined diagonally to the horizontal. This construction is used primarily in horizontal shaft pumps for which a vertical discharge is necessary and yet for which the convenience of an axially-split casing for internal examination of the pump is desired. A diagonally-split casing pump is illustrated in Figure 6.

End Suction Pumps

Most end suction single-stage pumps are made with one piece or so-called *solid casings*. At least one side of the casing must be open so the impeller can be assembled in the pump, thus necessitating a cover for that side. If the cover is on the suction side, it contains the suction opening as well as forms the side wall of the casing. This cover is called the casing suction head.

Some designs of end-suction, single-stage pumps with solid casings have casing suction heads for impeller removal, as in Figure 7, others are made with stuffing box heads (Figure 8), and still others have both casing suction heads and stuffing box heads.

For general service, the end-suction single-stage pump design is extensively used for small pumps up to 4- and 5-inch discharge size, for the motor mounted type and for the cheaper "contractor" types. In all of these types, the small size makes it feasible to cast the volute and one side integrally. The choice of whether the stuffing box side or the suction side is made integrally with the casing usually is determined by the general design of the pump with the general aim of obtaining the lowest possible cost. For larger pumps of this type especially those for special service, like sewage pumps, there is a demand for pumps of both rotations and a design with both a separate suction head and a separate stuffing box head permits utilizing the same casing for either rotation if the flanges on the two sides are made identical. Furthermore, for this latter group there is a demand for vertical shaft pumps which can best be disassembled by removing the rotor and bearing assembly from the top of the casing, while in many of the horizontal applications of the pumps of the same line, the installation favors partial dismantling from the suction side. Thus such lines are most adaptable if made with both separate suction heads and stuffing box heads.

Casings for Open Impeller Pumps

In the inexpensive type open-impeller pump, the impeller rotates within close clearance of the pump casing proper, as in Figure 8. When the service for which the pump is intended is more severe, a side plate is mounted within the casing to provide a renewable close clearance guide to the water flowing through the open impeller. One of the advantages derived from the use of side plates is that abrasion resistant material such as stainless steel may be used for the impeller and side plate, while the casing itself may be made of a less costly material. Such a construction is illustrated in Figure 9, which shows a special type of pump used to handle paper pulp stock also containing abrasive material.

While double-suction open-impeller type pumps are seldom used at the present, they were frequently used in the past and were generally constructed with side plates.

Pre-rotation and Stop pieces

Under certain improper entrance conditions or when the shape of the suction approaches are incorrect, the liquid column in the suction pipe may spiral for some distance ahead of the actual entrance into the impeller proper. This phenomenon is called "pre-rotation." The occurrence of the phenomenon may be occasioned by many factors, and may exist either with vertical or horizontal pumps.

Pre-rotation is usually harmful to the proper operation of the centrifugal pump because it causes the liquid to enter between the impeller vanes at an angle other than allowed for by the

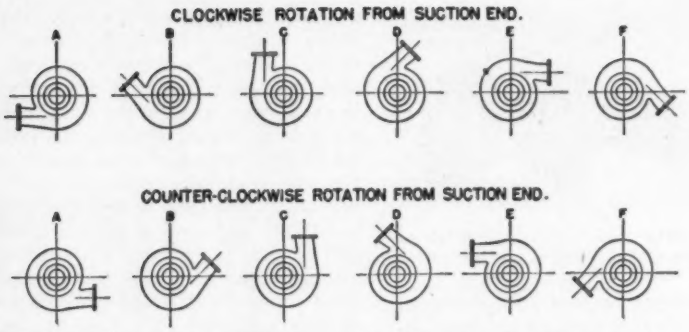


Fig. 10—Discharge nozzle locations for a solid casing end-suction type pump

designer in his calculations. This results frequently in a lowering of the net effective suction head and of the pump efficiency. Various means are used, either in the construction of the pump itself, or in the design of the pump approaches to avoid this phenomenon.

Practically all horizontal single-stage double-suction pumps and most multistage pumps are provided with a suction volute, the function of which is to guide the water in a streamline flow to the eye of the impeller. With the flow coming to the eye basically at right angles to the shaft, the flow is partly to both sides of the shaft but not in equal proportions. The suction waterways reduce in area meeting in a projecting section of the side wall dividing the two sections. This dividing projection is called a stop piece.

In end suction type of pumps, improper entrance conditions may cause pre-rotation. To prevent this, a radial fin stop piece projecting partly in toward the center from the suction nozzle wall may be incorporated in the design of end suction pumps.

Nozzle Locations

The discharge nozzle of end-suction single stage pumps is generally in a top vertical position (as in Figures 4 and 6), although other nozzle positions may be obtained in certain cases, such as top horizontal, bottom horizontal or bottom vertical discharge. Figure 10 illustrates the flexibility which can be imparted to such a pump with regards to discharge nozzle location. However, sometimes the pump frame, bearing bracket or baseplate will interfere with the discharge flange, prohibiting a bottom horizontal or bottom vertical discharge nozzle position. In certain other cases, solid casings cannot be rotated for various nozzle positions because the seal connection on the stuffing box would be inaccessible.

Practically all double-suction axially (horizontally) split casing pumps have a side-discharge nozzle and either a side or a bottom-suction nozzle. When the suction nozzle is placed on the side of the pump casing with its axial centerline at right angles to the vertical centerline of the pump, as in Figure 5, the pump is classified as a side suction pump. When its suction nozzle points vertically downwards, the pump is called a bottom suction pump. Single stage bottom suction pumps are rarely made in sizes below 10-inch discharge nozzle diameter.

Special nozzle positions can sometimes be provided for double suction axially split casing pumps in order to meet special piping arrangements as, for instance, a vertically split casing with bottom suction and top discharge in one half of the casing. Such special designs are generally costly and should be avoided.

Centrifugal Pump Rotation

Inasmuch as suction and discharge nozzle locations are intimately connected with the rotation selected for a given centrifugal pump, it is very important to understand the means used to define the direction of rotation.

According to the Hydraulic Institute Standards, rotation is clockwise or counter-clockwise when looking at the driven end of a horizontal pump or down on a vertical pump. Some manufacturers still designate rotation of a horizontal pump looking at its outboard end. Therefore, to avoid misunderstanding, clockwise or counter-clockwise rotation should always be qualified by the direction from which one looks at the pump.

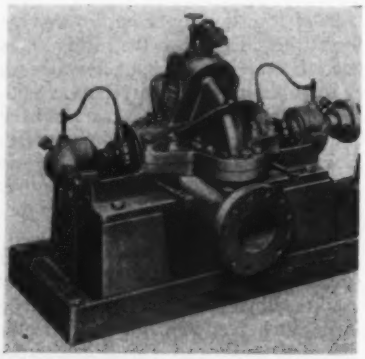


Fig. 11—Axially-split single-stage pump for high pressure and temperature

Inboard and outboard ends are terms used with horizontal pumps only. Inboard end is the one closest to the driver, while the outboard end is the one farthest away. In the case of dual driven pumps, the terms lose their significance and are not used.

Except for end suction pumps, with integral heads on either side when separate casing patterns are required, any given centrifugal pump casing pattern may be arranged for either clockwise or counter-clockwise quotation.

Casing Hand Holes

Casing hand holes are furnished primarily on pumps handling sewage and stringy materials which are liable to become lodged on the suction vane edges of the impeller or on the tongue of the volute to provide access for cleaning out such material without dismantling the complete pump. On the end-suction type of pump used primarily for handling liquids of this type, hand holes with access to the suction side of the impellers are provided on the suction head or in the suction elbow. Hand holes are also provided on drainage, irrigation, circulating and supply pumps when foreign matter may become lodged in the waterways. On very large pumps, manholes often are provided for access to the interior for both cleaning and inspection.

Mechanical Features

The majority of single stage centrifugal pumps are intended for service with moderate pressures and temperatures. As a result, it is the general practice of pump manufacturers to design a special line or lines of pumps intended for high operating pressures and temperatures rather than to render their standard line unduly expensive by making it suitable for too wide a range of operating conditions.

When axially split casings are subjected to high pressures, there is a tendency to "breathe" at the split joint, such a tendency leading to misalignment of the rotor and—which is even worse—to leakage. For such condi tions, internal and external ribbing is applied to casings at points subject to the greater stresses, as illustrated in Figure 11, which shows an axially split casing single-stage pump suitable for pressures up to 600 psi and temperatures up to 600 Fahr. In addition, while the majority of all pumps are supported by feet at the bottom of the casing (see Figures 5 and 6), high temperature conditions require centerline support, as in the case of the pump illustrated in Figure 11, so that as the pump becomes heated, expansion will not cause misalignment.

✦ PAPER SKETCHES ✦

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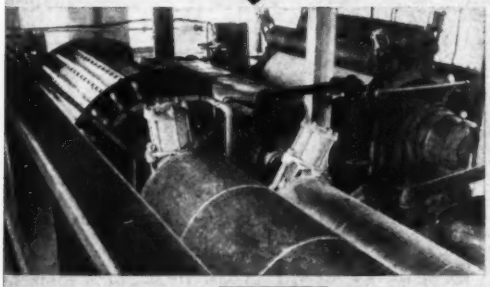

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Pitch Control

NOPCO 1216-V Used in the Washer, Nopco 1216-V emulsifies the solvent and the pitch in the solvent to reduce the liberated pitch content of sulphite pulp.

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NOPCO KF (for Sulphite) With its unique ability to destroy foam, Nopco KF increases the operating efficiency of pulp screening and pulp refining equipment.

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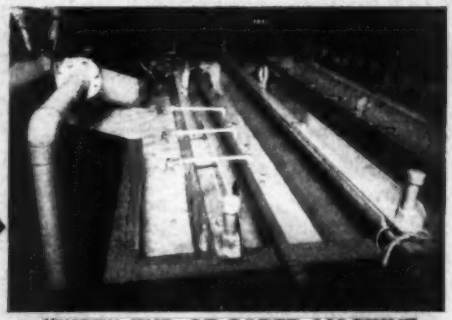

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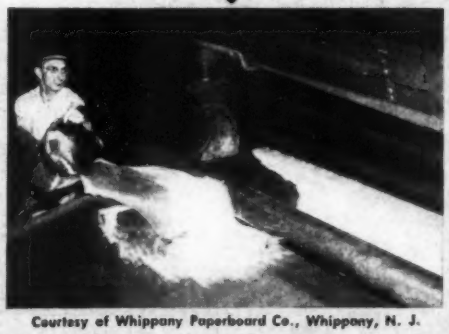

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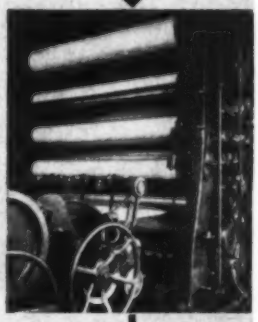
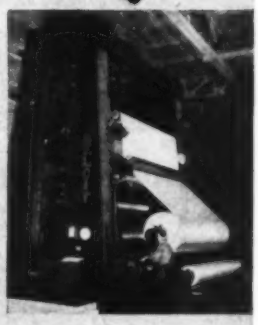
NOPCO 1400-B (Ammonium Stearate) Functions as a plasticizer, and aids in controlling dusting on the calender rolls.

MACHINE CALENDER STACK

NOPCO 2252 — Paraffin Wax Size Besides being used in the Beater, Nopco 2252 may be used as top or surface size in the Size Press or Calender Water Box. Often employed with starch, glue or casein emulsions. Improves printing qualities and increases scuff resistance of paper board.

NOPCO ESI Used in conjunction with starch to improve gloss ink printing on folding box board.





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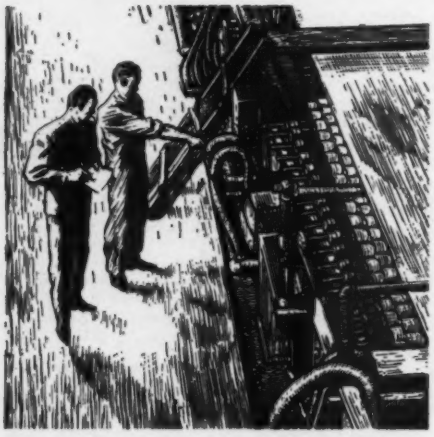

Appleton Field Engineering

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Names in the News...

WARD HARRISON BECOMES A VICE PRES. OF RIEGEL

The election of Ward Harrison as vice president in charge of production of the Riegel Paper Corporation, New York, New York, has been announced. Since the first of the year Mr. Harrison has been manager of production of all four Riegel plants and responsible for activities on the company's timberlands at Acme, North Carolina (cf. P.I. and P.W., February, 1949, p. 1642). He will continue these activities as vice president.

Mr. Harrison is a graduate of Iowa State College, Ames, Iowa, and holds a Ph.D. degree from the Institute of Paper Chemistry, Appleton, Wisconsin. He is a member of TAPPI, the Superintendents Association, and the American Institute of Chemical Engineers.

▼

WM. MILLSPAUGH AWARDED EDWARD LONGSTRETH MEDAL BY FRANKLIN INSTITUTE

In recognition of his outstanding contributions to the art of papermaking, and his introduction and promotion of the art of centrifugal casting, William Hulse Millspaugh, of Sandusky, Ohio, has been awarded the Edward Longstreth Medal of the Franklin Institute of the State of Pennsylvania. Mr. Millspaugh developed and patented suction rolls and papermaking devices which have helped to establish new world records for speed and production of paper.

Mr. Millspaugh attended Keuka College, at Keuka Park, New York. He began mechanical engineering work in Salem, Ohio, in 1895, and organized the Sandusky Foundry and Machine Company in 1902, manufacturing large bronze tubular products and pumps. This company, of which he was president until December, 1929, first produced the centrifugally cast rolls which are now used throughout the world in fourdrinier and other papermaking machines, ship propeller shaft covers, and similar machinery.

In 1933, Mr. Millspaugh introduced into Great Britain this same method for casting bronze and steel tubes by organizing Millspaugh, Ltd., of Sheffield, England. He retired from this company in 1946 and returned to the United States. At present he is president and director of Centrifugal Steel, Inc., a patent holding company, and vice president and director of The Hulse Investment Company, both in Sandusky, Ohio.

The list of organizations of which he is a member includes the American Society of Mechanical Engineers; the Technical Association of Pulp and Paper Industry, of which he is a gold medalist; the Cleveland Engineering Society; U. S. Military Engineers; the Institute of Mechanical Engineers, London, England, and the Army Ordnance Association.

The Longstreth Medal, founded in 1890, which includes a silver medal and a certificate, is awarded for meritorious work in science or the arts, and for some special work on a mechanical or scientific subject of importance.

Wm. H. Millspaugh

Arthur E. May

ARTHUR MAY IS NOW WITH MOORE & WHITE COMPANY

Appointment of Arthur E. May as assistant to the chief engineer at The Moore & White Company, Philadelphia, manufacturers of papermaking machinery, has just been announced.

Mr. May has been vice president of Central States Engineering, Inc., Appleton, Wisconsin, consulting engineers to the paper industry, and prior to this connection was with the Thilmany Pulp and Paper Company, Kaukauna, Wisconsin. He is a member of the American Pulp and Paper Mill Superintendents Association and of the National Society of Professional Engineers.

▼

DAVIES WILL BE SUPERVISOR BAKER-RAULANG ENGINEERING

The new manager of engineering at Baker-Raulang Company, Cleveland, is Robert H. Davies who will have supervision of all engineering activities of the company. Prior to coming to Baker, Mr. Davies was with Lincoln Electric Company for the past five and a half years and served as their representative in Washington, D.C., and as consulting engineer in charge of educational work.

Previous connections were: Lockheed Aircraft Corporation as production engineer; Northrop Aircraft, Inc., where he was in charge of all production and tooling methods for experimental and prototype airplanes and helped develop the Heliarc welding process for magnesium; Henry J. Kaiser Company as plant engineer in the building of Kaiser's magnesium plant, the alloy plant, the ferro-silicon plant, and the magnesium sand casting foundry; and Permanente, California, where he subsequently became superintendent and was in charge of production and plant development.

▼

MAIN OFFICE AND DISTRICT CHANGES IN PERSONNEL ARE ANNOUNCED BY JEFFREY MFG.

The following personnel changes have taken place recently at headquarters and in district offices of the Jeffrey Manufacturing Company, Columbus, Ohio:

Russell W. Knode, 13 years with the company, has been made assistant manager of the Export Division. Clark Allen is replacing E. F. Abram (retired) as head of the pricing department. F. E. McGovern, formerly in coal preparation engineering, has been transferred to coal preparation sales; Henry W. Nau will replace him in the engineering division.

H. C. Rockwell, district manager of the Baltimore office, is returning to the product sales division at the home office, and J. R. Brisley, who has been with the company's Philadelphia office, replaces him in Baltimore. Charles E. Lawall, Jr., a member of the home office student training division, has been assigned to the Philadelphia office.

▼

GEORGE COBEAN REPORTS ON WORLD MARKETS VISIT

Returning from an eight-month trip around the world, George G. Cobean, president of Bulkley, Dunton Paper Company, S.A., New York, New York, reports that his outstanding impression everywhere he traveled was that all countries are clamoring for American goods, including paper, but because of dollar scarcity are compelled to buy elsewhere, even to their disadvantage. "If the United States expects to maintain its foreign trade, which furnishes the extra ten per cent of volume of business required for the profitable operation of its industries, we must in every way possible increase our imports from abroad so that dollars may be made available for payment of

our finished products," Mr. Cobean said. "We are still doing too much insular thinking in this country, and must raise our sights if we are to maintain prosperity in our industries."

Mr. Cobean flew across the Pacific to Japan, and visited as well China, the Philippines, Indo-China, and all countries in Southeast Asia, and as a result the sales organization of the company's Far Eastern subsidiary, Bulkley, Dunton Paper (Far East) Co., Inc. of Manila, was expanded in all markets visited, he reports.

Two months at the end of his trip Mr. Cobean spent in Europe, visiting Greece, Italy, Switzerland, Germany, France, England, Scotland, Denmark, and Sweden. He noted definite signs of improvement and apparent beneficial effects of our European Recovery Administration, particularly in Italy and France, compared to that which he found two and a half years ago when he was last there. Italy has made a very marked recovery since the war, with the people working, apparently happy, and living about as normal. British papermakers are busy, although still laboring under too much unwise government control.

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APPLEBAUM WILL MANAGE COCHRANE'S COLD PROCESS WATER TREATING DIVISION

Cochrane Corporation, Philadelphia, announces the appointment of Samuel B. Applebaum as manager of its Cold Process Water Treating Division.

Mr. Cochrane is also vice president of the Liquid Conditioning Corporation, an operating subsidiary of Cochrane. He was formerly vice president of the Permutit Company and later president of Liquid Conditioning Corporation.

S. B. Applebaum

Gerald F. Twist

GERALD TWIST IS MANAGER OF PEERLESS PUMP DIVISION

Effective September 1, Gerald F. Twist became manager of the Peerless Pump Division of the Food Machinery and Chemical Corporation, with headquarters at Los Angeles. Mr. Twist has taken over the duties of Francis F. Fairman, Jr., who is resuming his former association with the General Electric Company.

Mr. Twist has been associated with three other divisions of the FMC Corporation, both before and after becoming a director and executive vice president of the Atlas Imperial Diesel Engine Company at Oakland, California. In January of this year, Mr. Twist was made a vice president and manager of FMC's newly acquired subsidiary, Stokes and Smith Company of Philadelphia, builders of dry products packaging equipment and paper box making machinery.

▼

▶▶▶ *Chris Borggren,* associated with the Kimberly-Clark Corporation for the last six years, has been appointed administrative director of trades, industry, engineering and architecture at Hampton Institute of Agriculture and Technology at Hampton, Virginia.

▼

▶▶▶ *Clifford W. Gaylord,* president of the Gaylord Container Corporation, St. Louis, Missouri, has been appointed a member of the Missouri State Conservation Commission by Governor Forrest Smith. Mr. Gaylord (a former Adjutant General of Missouri) will serve a six-year term. In making the appointment Governor Smith cited his special qualifications because of the program of reforestation carried out on his property in Louisiana.

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▶▶▶ *Jotham R. Condit* has resigned as comptroller of the West Virginia Pulp and Paper Company, Mechanicville, New York, effective September 9, the 40th anniversary of his employment with the firm. Mr. Condit will continue with the company in a special part-time capacity.

Stuart W. McLaughlin, assistant comptroller of the firm since 1945, has been elected to succeed Mr. Condit. The position of assistant comptroller will be filled by *Robert L. Bentley,* who has been an accountant in the company's New York offices since April, 1947.

▼

▶▶▶ *Matthew J. Delehaunty* has been named to succeed J. W. Greenwalt as district sales manager for the Pittsburgh, Pennsylvania, branch of the mechanical goods division of the United States Rubber Company, New York. Mr. Greenwalt has retired. Mr. Delehaunty joined the company in 1922 as a clerk in the Pittsburgh branch, and for 15 years specialized in the sale of the company's wire products, serving in various administrative and sales capacities, and in 1937 became a salesman for the mechanical goods division.

JACOBS AND DeWEESE NOW REPRESENT DILTS DIVISION

Appointment of R. J. Jacobs and L. E. DeWeese as field representatives for the Dilts division of The Black-Clawson Company to handle Dilts converting equipment and Kohler paper-winding equipment respectively, has been announced.

R. J. Jacobs

L. E. DeWeese

Beginning in 1942, Mr. Jacobs served in engineering capacities with Goodyear Aircraft Corporation, Akron, Ohio, and Mercury Engineering Corporation, Milwaukee, Wisconsin, including two years of independent consultation service in Madison, Wisconsin.

Mr. DeWeese was vice president and director of the Kohler System Company at the time of its purchase by Black-Clawson. Immediately before that, he served the U.S.A.F. for four years. Previously he had been associated with Geo. H. Mead Company, Dayton, Ohio, being western representative of that company for a considerable period, with headquarters in Chicago.

▼

MANDO MAKES SCHLAFGE GEN. SUPT. P&P DIVISION AT INTERNATIONAL FALLS

Appointment of William H. Schlafge to the post of general superintendent of the International Falls pulp and paper division of Minnesota and Ontario Paper Company was announced recently.

Mr. Schlafge, who was formerly assistant general superintendent, succeeds E. L. McCormack, veteran paper mill executive, who becomes special assistant to the resident manager. Mr. McCormack will serve in a consulting capacity in the operations of the pulp and paper division.

A Mando employee since 1930, Mr. Schlafge has held the position of assistant general superintendent of pulp and paper production at the Falls mill since February 1, 1947. He previously served as chief chemist and prior to that was chemical engineer in the research department. Before his connection with Mando, he served for

Here's evidence of safer turbine operation with...

Why will Nonpareil Turbine Oil assure more reliable operation of your turbines? The answer is revealed by this 21-year record of "Nonpareil" in a power generating station, owned and operated by the Carnegie-Illinois Steel Corporation.

"Nonpareil" was put into the 30,000 KW General Electric turbine in 1927, and into the two 15,000 KW Allis-Chalmers units the next year. In over 21 years' operation on "Nonpareil," there have been no oil replacements, no cleaning of oil systems, no oil removed for treating. Neutralization numbers of all fills of oil have remained below 0.08 mg. KOH/gm. No outages have been enforced by oil troubles or oil-system maintenance.

Such performance records as this furnish ample evidence that "Nonpareil" lives up to its guarantee that *it will not increase in acidity above a neutralization number of 0.15 mg. KOH/gm.* This guarantee of "Nonpareil" is your insurance against outages caused by oil failure.

NONPAREIL
Turbine Oil

You can end acidity trouble and oil maintenance once and for all, by shifting to Nonpareil Turbine Oil. If your plant is located in the Midwest, write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, to secure the services of the Standard Oil Lubrication Engineer nearest you.

STANDARD OIL COMPANY (INDIANA) STANDARD

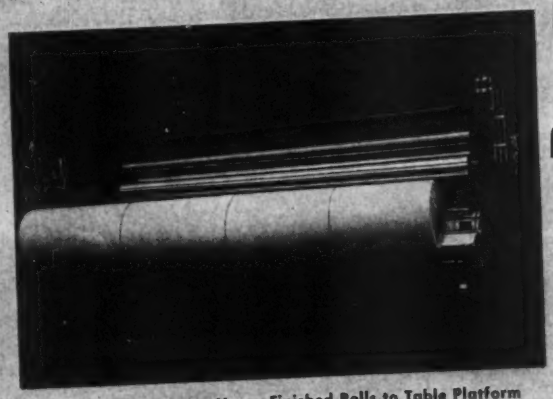
IT PAYS to unload heavy rolls this new easy way...

Camachine

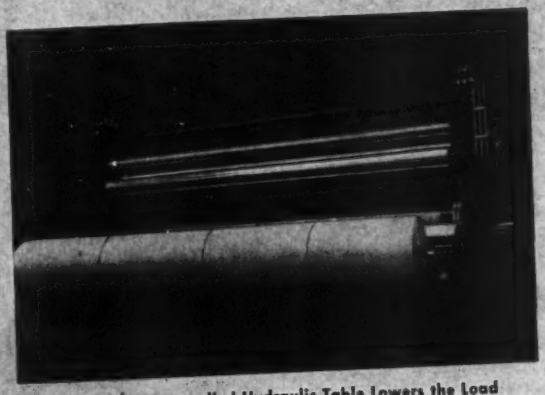
Motor Driven Roll Ejector

Hydraulic Unloading Table

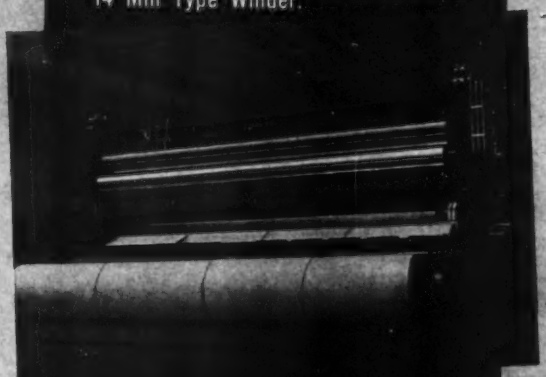
Here's a cost-cutting combination that's worth investigating! On big new Camachine Mill Type Winders 20, 19 and 18, the roll ejector is standard equipment, the unloading table optional. Both are optional equipment on the smaller Camachine 14 Mill Type Winder.



Motor Driven Ejector Moves Finished Rolls to Table Platform



Push-Button Controlled Hydraulic Table Lowers the Load



8 SECONDS TO THE FLOOR
SAVE TIME • PAPER • WORK

MECHANIZED ROLL UNLOADING . . .

CAMACHINE mechanized unloading equipment speeds up handling of finished rolls—cuts costly downtime on the winder during roll changes—saves loss of paper during roll changes — and reduces the danger of damaged rolls and accidents at the winder by eliminating manual handling of the heavy rolls. Consult with Camachine engineers for complete information on the motor driven roll ejector and hydraulic roll unloading table. Also—investigate Camachine pneumatic cutter units and other new Camachine cost-cutting features designed to provide top quality winder service to the world's fastest paper machines.

Camachines *FOR FAST, TOP QUALITY ROLL PRODUCTION*

WRITE FOR LITERATURE *. . . the world over*

CAMERON MACHINE COMPANY, 61 POPLAR STREET, BROOKLYN 2, N.Y.

two years as analytical control chemist for the DuPont industries at Wilmington, Delaware.

Mr. McCormack, whom Schlafge succeeds, recently rounded out a half-century of service to the pulp and paper industry. He has been a major executive since 1922, the year he became superintendent for St. Lawrence Paper Company at Three Rivers, Quebec. Immediately prior to joining Mando in 1938, he was general superintendent for five St. Regis Paper Company mills in New York state.

▼

FRANK GODSEY HEADS NEW WESTINGHOUSE DIVISION ON PRODUCTS DEVELOPMENT

The manager of the newly-formed Special Products Development Division of Westinghouse Electric Corporation is Frank W. Godsey, Jr., who formerly directed the New Products Department, now absorbed by the new division.

In addition to conducting market surveys and recommending action on new product lines, the division will carry on pilot plant work on new products. It also will negotiate and direct the technical work on special military developments.

Frank W. Godsey, Jr.

Wm. S. Snyder

WM. SNYDER MADE G.M. OF I. P. CO.'S CONTAINER DIV.

Effective August 23, 1949, William S. Snyder has been appointed general manager of International Paper Company's Container Division. Mr. Snyder's experience in the container business dates back to 1928, first with Fort Wayne Corrugated Paper Company, and for the past 14 years with International's Container Division and its predecessor. He has been general sales manager for the past five years, and prior to that was in charge of the Kansas City and Chicago container plants. For the time being he will continue to act as general sales manager as well as general manager of the Division.

Mr. Snyder succeeds William P. Davis, who had been general manager of the Division since 1944 and who has resigned to accept a position with another company. Mr. Davis is continuing with International in an advisory capacity until September 30, 1949. He has not as yet made any announcement as to the name of the firm he will join after that date.

▼

SPURGEON SPANGLER RETIRES FROM SCHMIDT & AULT CO.

After 32 years of continuous service with the Schmidt & Ault Paper Company, Spurgeon Spangler has retired.

Mr. Spangler has really been "through the mill." He started in with the company as shipping clerk, was promoted to purchasing agent, became a salesman, and a number of years ago was made sales manager.

He has been a member of the Salesmen's Association of the Paper Industry for the past six years and one of its most enthusiastic supporters.

▼

"STU" ARNETT NOW WITH NEW YORK SALES OFFICE CHAMPION PAPER & FIBRE

The appointment of Stuart E. Arnett to the New York sales staff of The Champion Paper and Fibre Company, Hamilton, Ohio, has been announced. Mr. Arnett has been associated with the graphic arts industry most of his life.

Prior to his joining Champion, Mr. Arnett was with the Printing Machinery Division of the Electric Boat Company, where he was responsible for all phases of sales, service and advertising. Before his association with the Electric Boat Company, he was New York branch manager of the Harris-Seybold Company.

During the war, "Stu" Arnett, as he is known in the industry, served in the United States Marine Corps as an aviation engineering officer.

As a member of the New York sales office, he will assist in sales and service work with Champion customers. John P. Osborne, a vice president of the company, manages the New York office.

▼

R. H. BACON ELECTED TO PRESIDENCY OF CHICAGO TECH. SOCIETIES COUNCIL

The newly-elected president of the Chicago Technical Societies Council for 1949-1950 is R. H. Bacon. Mr. Bacon is vice president of the Industrial Advertising Agency of Kreicker & Meloan, Inc., and president of R. H. Bacon & Co., Business Paper Editorial Service. For the past 25 years he has been active in engineering society work in Chicago, having been chairman of the Chicago Section of the American Society of Mechanical Engineers in 1928 and president of the Chicago Engineers Club in 1947.

The Chicago Technical Societies Council is made up of some 50 scientific, engineering, and technological societies representing approximately 18,000 members.

▼

FRANK M. MASON IS MADE ENGINEERING DIRECTOR FAIRBANKS, MORSE & CO.

The appointment of Frank M. Mason, Jr., as director of engineering has been announced by Fairbanks, Morse & Company, Chicago. He will continue to be located at the firm's headquarters office in Chicago.

Mr. Mason, who has for several years been manager of the research division in charge of all research, developments, and patents, joined the company in 1922. He was first employed in the engineering department of the company's Indianapolis plant. In 1923 he was transferred to St. Louis to organize a patent department for the firm. In 1925, he entered the research division in Chicago and became successively assistant manager in 1940 and manager in 1946.

He is well known in Navy circles and is a member of the American Society of Naval Engineers.

Frank M. Mason, Jr.

C. W. Klaus

CHAS. KLAUS AND EARL MILLS GIVEN NEW POSTS BY DIAMOND ALKALI CO.

Advancement, effective immediately, of two key sales executives of the Diamond Alkali Company, Cleveland, Ohio, was announcement August 17. Earl J. Mills has moved to Houston, Texas, as manager of the Southwest Sales District, which embraces the states of Texas, Oklahoma, and Kansas. He has been for the past two and one-half years manager of less-carload sales at the Chicago office. Charles W. Klaus, manager of carload sales, Chicago, since 1947, has been named to take complete charge of Diamond sales activities affecting the seven-state area of Illinois, Indiana, Iowa, Michigan, Minnesota, Wisconsin and Nebraska, with headquarters in Chicago.

Enlarging the company's long-

established branch sales operations at Wichita, Kansas, Oklahoma City, Oklahoma, and Houston and Dallas, Texas, creation of this Southwest sales district and Mr. Mills' appointment as manager, together comprise a move designed to expand and co-ordinate Diamond's existing sales activities and service facilities throughout the Southwest. Mr. Mills brings 17 years of sales experience with Diamond to his new post, in which he will have supervisory responsibility of the four branch offices mentioned above and will work in close collaboration with headquarters in Cleveland.

▼

SAM SIEGEL MOVED TO NEW YORK FROM PALATKA—GEO. BALKO SUCCEEDS

New resident manager at the Palatka, Florida, mill of Hudson Pulp & Paper Corporation, is George H. Balko, formerly of The Mead Corporation, Chillicothe, Ohio. He succeeds Sam Siegel, who has been transferred to the company's New York office.

Charles Grondona, who maintains headquarters in the Hudson company's New York office, is manager of operations for the company's mills at Palatka, Florida, Lansdowne, Pennsylvania, and Bellows Falls, Vermont. Anton Lund, vice president of the corporation, is in charge of plants, engineering, and development.

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▶▶▶ *Melvin H. Baker,* president of the National Gypsum Company of Buffalo, has been elected to the board of directors of the Safety Council of Western New York.

▼

ROBERTS RETIRES FROM BEMIS PLANT IN PEORIA—SUCCEEDED BY L. J. FINN

The retirement of Ernest B. Roberts as manager of its paper mill and multiwall bag factory at Peoria, Illinois, has been announced by Bemis Bro. Bag Company. Mr. Roberts will remain with the company in charge of pulp and rope purchasing with headquarters at Peoria. He is succeeded by L. J. Finn, who has been assistant manager at Peoria.

Mr. Roberts joined Bemis in 1911. It was he who chose Peoria as the site for the company's paper mill. He was in charge of construction and bought the equipment, and when the building was completed in 1913, he was made mill manager. Mr. Roberts is a member of the Technical Association of the Pulp and Paper Industry.

Mr. Finn first started with the company in the engineering department at St. Louis in 1914. He later entered sales work and for several years traveled in Mexico. In 1925, he was transferred to the Peoria plant as sales manager, and was appointed assistant manager in 1935.

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▶▶▶ *Alex Rockenbrock,* foreman and pipefitter at the Tonawanda, New York plant of the Robert Gair Company, Inc., was recently presented a check for $250 for a suggested improvement in the plant's sprinkler system.

▼

▶▶▶ *Harry S. C. Folk* has been added to the sales force of the newly formed Automatic Transportation Company factory branch sales office at 347 Madison Avenue, New York, successor to Raymond L. Smith Associates. Mr. Folk, who was a member of Smith's organization when it represented Automatic in New York (up to June 1, 1949), will be in charge of railroad sales.

Joseph J. Powle is also a new member of Automatic's New York sales force. He will cover the counties of Queens, Nassau, Suffolk, Westchester, Rockland, and the Bronx. He comes to Automatic from the F. H. Trethewey Company, Charlotte, North Carolina.

▼

▶▶▶ *Edgar E. George* has been appointed district sales representative with headquarters in High Point, North Carolina, states an announcement from The Baker Industrial Truck Division of The Baker-Raulang Company, Cleveland, Ohio. In this capacity Mr. George will serve as material handling engineer for Baker truck applications and will handle the sale of the equipment.

James H. Rigby will be associated with Mr. George. Mr. Rigby has had extensive experience as a methods engineer. Prior to his present assignment, he was with the DuPont Company at Wilmington and subsequently with Burlington Mills, Greensboro, North Carolina, as material handling co-ordinator.

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▶▶▶ *H. L. Miner,* manager of the Safety and Fire Prevention Division, E. I. du Pont de Nemours & Company, Inc., was named chairman of the Safety Code Correlating Committee of the American Standards Association at its recent meeting. The committe is the top technical group in charge of the development of national safety standards of the Association. Mr. Miner, who represents the Manufacturing Chemists Association and the National Fire Protection Association on this committee, has been active in safety work for many years.

OFFICIAL DUTIES SHIFTED AT MORSE CHAIN COMPANY

Walter M. Reynolds has been elected secretary of Morse Chain Company, a division of Borg-Warner Corporation, Chicago. He also retains his post as controller of the division, which operates plants in Detroit, Ithaca (New York), and England.

The duties of treasurer of Morse Chain have been assumed by R. P. Johnson, the first vice president. The positions of secretary and treasurer now filled by Reynolds and Johnson were formerly combined in one office held by the late Stanley B. Waring.

Prior to joining Morse Chain Company, Mr. Reynolds was controller of the Hughes Tool Company, Houston, Texas. He also has been assistant treasurer of Curtiss-Wright Corporation and treasurer and controller of William Sellers & Company, manufacturers of machine tools.

▼

DETREX ADDS 2 SPECIALISTS

Two Detrex specialists on alkali and emulson cleaning have been appointed to its consultation service staff by the Detrex Corporation, Detroit, Michigan.

They are W. H. Webb, who has had many years of experience with Detrex, and Alan Harris, who for some time has been concentrating his efforts on the field development work. Mr. Webb has been placed in charge of the alkali and emulsion phases of sales, service, and consultation in the central United States. His knowledge will be of particular value to the metal fabricating and finishing industries. Mr. Harris will serve the metal industry in the Detroit area.

▼

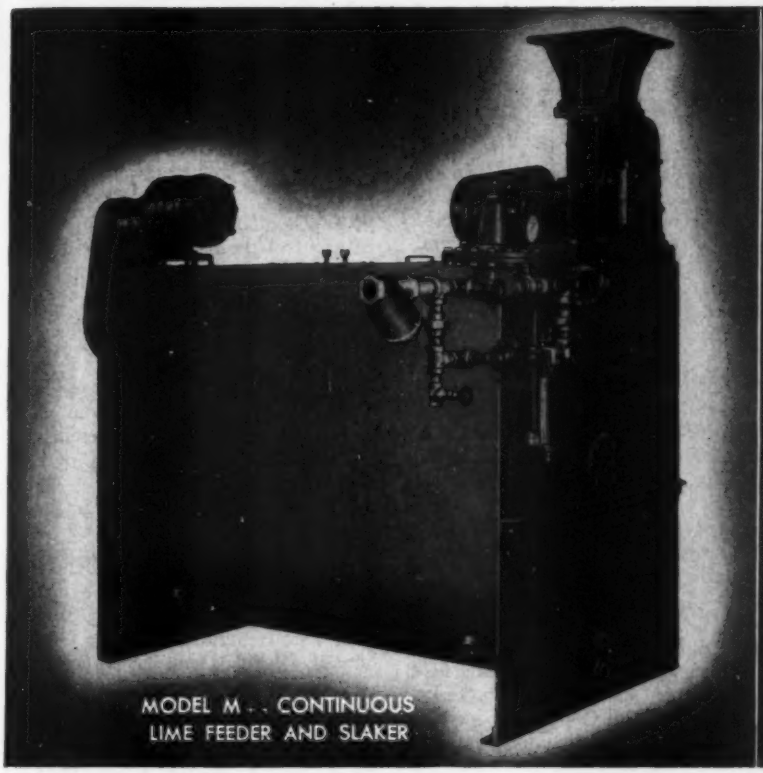
RELIANCE INCREASES ITS FIELD SALES PERSONNEL

Additions to the field sales personnel for three of its district offices have been announced by The Reliance Electric & Engineering Company, Cleveland, Ohio. Emory G. Orahood, Jr., goes to Atlanta, Georgia; Robert B. Reed to Birmingham, Alabama; and John Drollinger, Jr., to Detroit.

Mr. Orahood has been a Reliance sales engineer in Birmingham, Alabama, and will be the first direct sales representative that Reliance has had in Atlanta. His offices will be in the Candler Building.

In addition to his home office training Mr. Reed handled steel mill sales work for Reliance for two and a half months in the Gary, Indiana, district.

Mr. Drollinger is a recent electrical enginering graduate of the University of Michigan, and this is his initial sales assignment for Reliance.



MODEL M . . CONTINUOUS LIME FEEDER AND SLAKER

MODEL MCO . . SOLUTION CHEMICAL FEEDER

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The Infilco line includes Continuous Lime Feeders and Slakers, Solution Chemical Feeders, Chemical Mixers and Feeders, Dry Chemical Feeders . . all precision built for years of economical, trouble-free operation. Some of their superior features are: 1. Greater accuracy, 2. Elimination of waste, 3. Dustless operation, 4. Automatic proportional feed controls, 5. Wide range of operating rates, 6. Proved in hundreds of installations from coast to coast, 7. Durable construction. Get complete information. Write today!

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Make sure your water meets the exacting specifications you require. Send for our Water Analysis Sheet, then fill in and return it with a sample. You will receive our laboratory analysis and report promptly. A valuable INFILCO CHEMICAL CALCULATOR slide rule sent FREE to all who return our analysis sheet properly completed. *No cost or obligation is involved for this laboratory service.*

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SALES OFFICES IN TWENTY SIX PRINCIPAL CITIES

WORLD'S LEADING MANUFACTURERS OF WATER CONDITIONING AND WASTE TREATING EQUIPMENT

▶▶▶ *J. F. Fitzsimmons* has succeeded J. R. Reed as manager of the commercial research department of Allis-Chalmers, Milwaukee, Wisconsin. Mr. Reed has resigned to establish his own business. Mr. Fitzsimmons has been associated with the company since 1943. In 1946 he became supervisor of the department's market research section, and he is a past president of the Milwaukee chapter of the American Marketing Association.

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▶▶▶ *L. R. Andrews* was recently elected executive vice president and manager of The British Columbia Lumber Manufacturers Association, Vancouver, British Columbia.

Earl C. King was elected secretary of the Association.

▼

▶▶▶ *George S. Dively,* president of Harris-Seybold Company, Cleveland, Ohio, has been named by the Merchants and Manufacturers Association, Los Angeles, to be one of ten conference leaders at the M & M's Seventh Annual Employer-Employee Relations Conference to be held in October at Palm Springs, California.

▼

▶▶▶ *John B. Eisen,* formerly group leader with the chemical research laboratories of American Viscose Corporation at Marcus Hook, Pennsylvania, and connected with that organization for ten years, has now joined the staff of the Bjorksten Research Laboratories as section leader at its Madison, Wisconsin, laboratories.

▼

▶▶▶ *Oscar C. Stark* has joined Photoswitch Incorporated as general sales manager with headquarters in the factory sales office, 39 Broadway, New York City, and has severed his association with the Square D Company, with whom he has been connected in various sales and management capacities since 1930. Previous to his association with Square D, he was with the New York sales office of the General Electric Company.

▼

▶▶▶ *W. H. Shine* has been appointed a member of the sales staff of the New York Offices by Mohawk Paper Mills, Inc., Cohoes, New York.

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▶▶▶ *C. C. Bray* has been appointed regional supervisor of the new Midwestern District Office recently opened by the IMO-DeLaval Products Division of DeLaval Steam Turbine Company. The new office is located at 1500 S. Western Avenue, Chicago 8, Illinois.

F. H. Bagley has been transferred from the DeLaval Chicago District Office to the new Midwestern Office, where he will continue to handle sales and service.

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▶▶▶ *J. W. Morgan* has been advanced to the position of assistant sales manager of Hyster Company's eastern sales division. He will be in charge of tractor equipment sales activities and will be located at the Peoria, Illinois, plant. Headquarters of the company are in Portland, Oregon.

▼

▶▶▶ *William H. Corwin* has recently been appointed public relations director of Taylor Instrument Companies, Rochester, New York. Mr. Corwin joined the organization in 1942 as a member of the advertising department, and since 1943 has edited the company's publication, *The Taylor Meteor,* as well as prepared other company literature.

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▶▶▶ *E. R. Traxler* has been promoted to manager of the new flat belting field engineering and development department of the B. F. Goodrich Company, Akron, Ohio. Mr. Traxler has been with the company since 1935, and has spent all of his career in product development.

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▶▶▶ *Bernard H. Holman,* employed in Eastman Kodak Company's paper mill in Rochester, New York, has collected $5,000 for a suggestion. This is the largest award made through the Kodak Suggestion System for a single idea. His idea concerned a change in the solution used in an electroplating silver recovery process, which has made it possible to increase the output. This was his 43rd suggestion. He has been an employee of the company since 1929 and in the paper mill since 1932.

▼

▶▶▶ *George E. Gilliam* will manage pyrometer supplies sales nationally for the Brown Instruments division of Minneapolis-Honeywell Regulator Company. His headquarters will be at the Brown division home office in Philadelphia. Mr. Gilliam has been with the company for the past five years, most recently at its South Bend branch office.

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▶▶▶ *Frank Ross,* national manager of lubrication for E. F. Houghton & Company, has been appointed to the newly-created post of assistant to the vice president—sales. He will retain his duties and title as head of the lubrication department, although his headquarters have been moved from Cleveland to the home office in Philadelphia. Mr. Ross joined the company in 1942 from the Lubri-Zol Sales Company, Cleveland, when Houghton took over that company's industrial lubricants division, and since 1944 has been in charge of Houghton's lubrication development work.

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▶▶▶ *Douglas Jones* has been named manager of the Salt Lake City district office of the Chain Belt Company, Milwaukee, Wisconsin. He will operate his business as the Douglas Jones Company at 1551 Redondo Avenue, Salt Lake City, Utah. Mr. Jones is well known in Utah engineering circles through his activities in various engineering societies, and is at present vice president of the Utah Society of Professional Engineers.

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▶▶▶ *John C. Toomey* has joined the Detroit district office, of the Chain Belt Company of Milwaukee, as a district sales engineer. Mr. Toomey studied mechanical engineering at the University of Michigan, and has an engineering background of 20 years of experience in selling and applying of material handling equipment. He has just completed special training in the application of Rex and Baldwin-Rex products at the Milwaukee, Springfield, and Worcester plants of the company.

Necrology

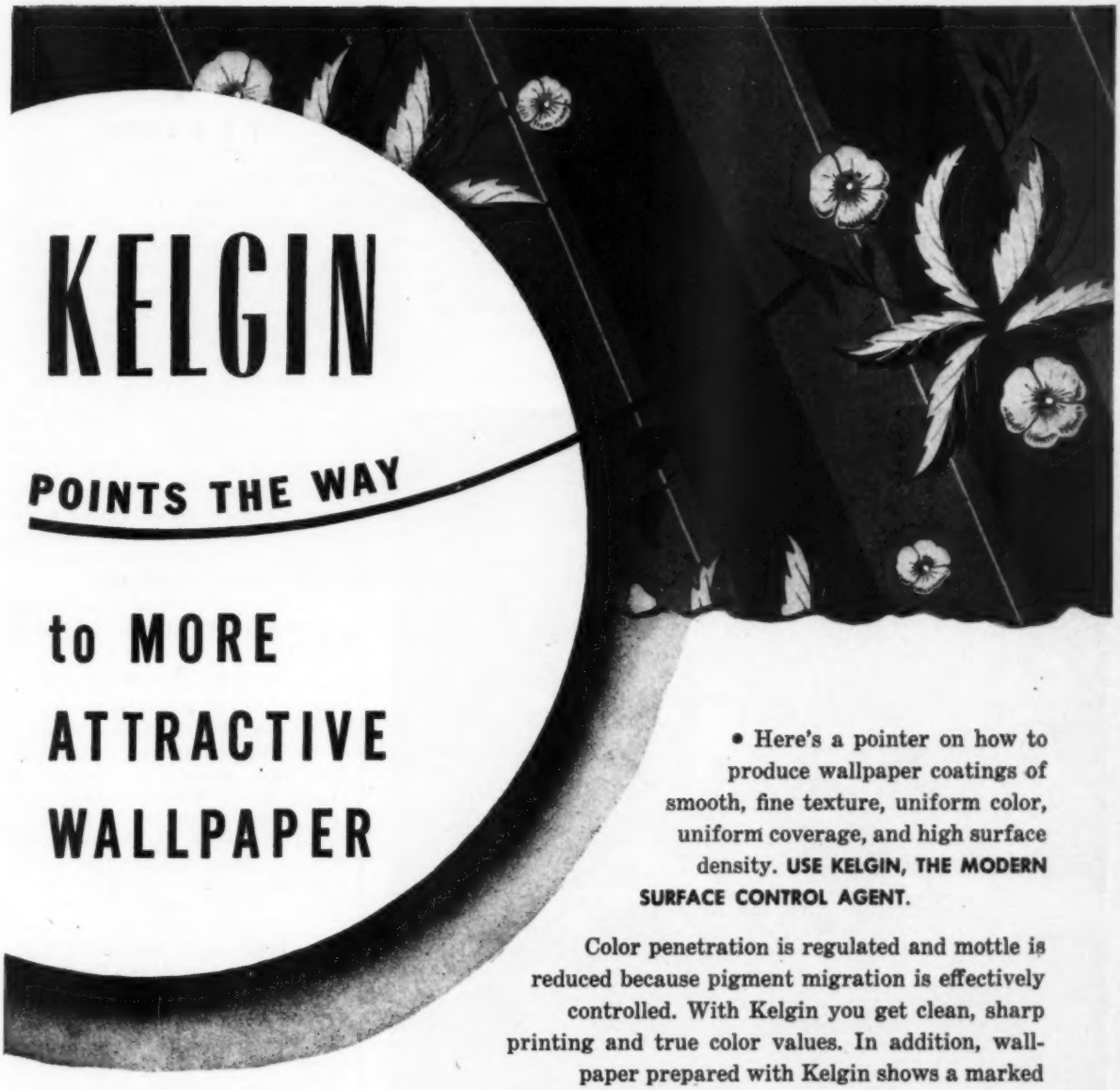
SVEN BRUN BUGGE

A man whose name will stand as one of the pioneers in the pulp and paper industry of this country passed away August 9 at Merrill, Wisconsin, at the age of 71.

Sven Brun Bugge was formerly president of the Tomahawk Kraft Paper Company, Tomahawk, Wisconsin. He retired from active duty in 1946 when that mill was taken over by the National Container Corporation.

Mr. Bugge was born in Norway. His technical training and first engineering experience were obtained in his native country. He then became affiliated with Lubecker Machinenhau, Gesselschaft, Germany, but later migrated to Canada where he was employed by La Compagnie de Pulp de Chicoutimi and the Brompton Pulp & Paper Company, Limited, both in Quebec.

In 1911, Mr. Bugge came to the



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Color penetration is regulated and mottle is reduced because pigment migration is effectively controlled. With Kelgin you get clean, sharp printing and true color values. In addition, wallpaper prepared with Kelgin shows a marked reduction in curl.

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Cable address: KELCOALGIN — New York

States where he made a connection with O. Bache Wiig, who introduced the sulphate process in North America. The two men worked together on construction of what was then the Wausau Sulphate Fibre Company (now Mosinee Paper Mills Company)—this was the second sulphate unit to be built on this continent.

Mr. Bugge remained as chief engineer of that company until 1923. While there, through his association with O. Bache Wiig, he assisted in the building of a plant at Bogalusa, Louisiana, and one at Ocean Falls, British Columbia.

When the Tomahawk Kraft Paper Company took over a plant in Tomahawk and rebuilt it into a sulphate pulp mill, Mr. Bugge was active in the work and became the company's vice president and general manager. He was later made president, which office he held until his retirement.

Mr. Bugge was instrumental in establishing many forestry practices in Wisconsin; he was one of the organizers and a former vice president of Trees for Tomorrow, Inc. He held a life membership in the ASME and the American Forestry Association.

Mrs. Bugge, who still resides in Tomahawk, and two sisters in Norway are the only survivors.

▼

T. L. B. LYSTER

Former chief engineer of Hooker Electrochemical Company, Niagara Falls, New York, T. L. B. Lyster, passed away August 18. He was 70 years old. At the time of his passing, Mr. Lyster was a consulting engineer for the Hooker company. He became associated with the company in 1907 as a construction engineer when it was known as the Development and Funding Company.

After World War I (during which he became a lieutenant colonel in the Army Engineering Corps), Mr. Lyster returned to Hooker in 1919 as director of development. From 1922 to 1932 he devoted a large part of his time to the pulp industry, serving as a consultant to Hooker in the meantime. From 1937 to 1948 he was chief engineer.

He was a member of a number of professional chemical and engineering societies.

▼

▶▶▶ *Joseph H. Eilers,* former general superintendent of the United Board & Carton Corporation Plant in Lockport, New York, passed away August 9 in Peoria, Illinois. He was born in Lockport and entered the employ of United Board many years ago. Two sons and three daughters survive. He was 89 years old.

▼

▶▶▶ *James Logie,* associated with the paper trade in Canada and England for more than half a century, passed away August 27 in Toronto, Ontario. Born in Scotland, Mr. Logie had been associated with the paper industry in Inverness and Liverpool. In Canada, he had been with Barber-Ellis Company of Canada, Ltd., and the Beaverboard Company.

▼

▶▶▶ *F. Howard Cronin,* of Yorklyn, Delaware, who retired recently as chief engineer of the National Vulcanized Fibre Company, Yorklyn, passed away July 29. He is survived by his widow and a son, John H. Cronin of Newark. Mr. Cronin had been with the fibre company for about thirty years. He was 71 years old.

▼

▶▶▶ *William M. Harris,* sales representative for several paper firms in Ontario, Canada, for the past 25 years, passed away August 5 in Toronto. He had traveled extensively in the paper trade throughout Ontario. His widow and nine children survive.

Team up with the *DRAPER FELT* to obtain the best results for your requirements.

The DRAPER Felt

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

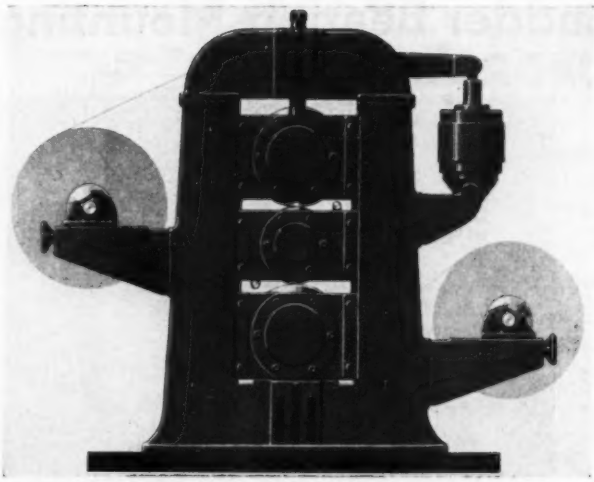
CANTON, MASSACHUSETTS

RALPH E. BRIGGS, *Sales Manager*

● BRADFORD WEST, *Pittsfield, Mass.* ● WILLIAM N. CONNOR, *Jr., Canton, Mass.* ● L. H. BREYFOGLE, *Kalamazoo, Mich.* ● WALTER A. SALMONSON, *2514 Northeast 59th Ave., Portland, Oregon* ● L. L. GRIFFITHS, *Jr., Kalamazoo, Mich.* ● HAROLD H. FISH, *Syracuse, N. Y.* ●

SPECIALIZATION in paper finishing

calls for control of many variables



APPLETON LABORATORY CALENDER

as a SUPERCALENDER • MACHINE CALENDER CALIPER CALENDER • SHEET CALENDER

Appleton Laboratory Models can be furnished as any one or in one or more combinations—as a Supercalender, with two chilled iron rolls and one filled roll—as a Machine Calender, with all chilled iron rolls—as a Caliper Calender, with micro adjustment for roll spacing—as a Sheet Calender, for processing sheets. Applied pressure can be either Pneumatic or Screw Down.

Here is a precision built three roll unit capable of a wide variety of adaptations. Here is an economical means for working out finishing problems in the laboratory on technical control and development of paper and fibrous sheet and web finishing and coating. Write for detailed specifications and full information, indicating your requirements.

It is not so many years ago that a few standard hard and soft filled rolls met most of the superfinishing requirements of the day. Now each application must be custom-built for particular results.

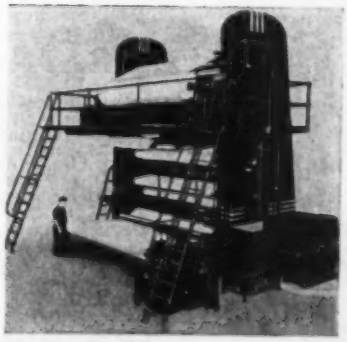
Many variables influence the proper finishing of paper-fiber content, binder pigment, moisture content, caliper, temperature, pressure, operating speeds, roll size and density, fillings and coatings—these and others help to determine the quality of the finish on a sheet of paper. Specialization and new developments only emphasize the importance of controlling these variables to obtain uniformity and high quality finish.

As a supplier of the mechanical equipment for supering paper, Appleton extends every effort to provide the precision operation that makes control of many of the variables possible. The latest engineering refinements for smooth performance and accurate control are incorporated in Appleton Supercalenders—for the laboratory—for experimental runs—for every application in the mill or finishing room—in Appleton's complete selection of filled rolls—in Appleton Auxiliary Equipment. Mill technicians and Appleton engineers work together to improve and control the quality of finish on paper.

SINCE A 1883

COMPLETE SUPERFINISHING EQUIPMENT

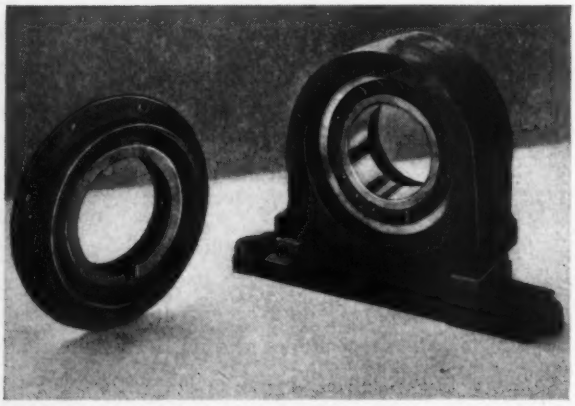
Experimental Supercalenders • Laboratory Calenders • Web Supercalenders • Glassine Supercalenders • Friction Calenders • Embossing Calenders • Cotton, Paper, Laminated and Special Process Supercalender Rolls • Chilled Iron Rolls • Embossing Rolls • Unwind and Windup Reels • Winders • Tension Controls • Hydraulic Pressure Systems • Oiling Systems • Brakes • Operating Control Panels • Spread and Fly Rolls • Steam Showers • Roll Trucks • Etc.



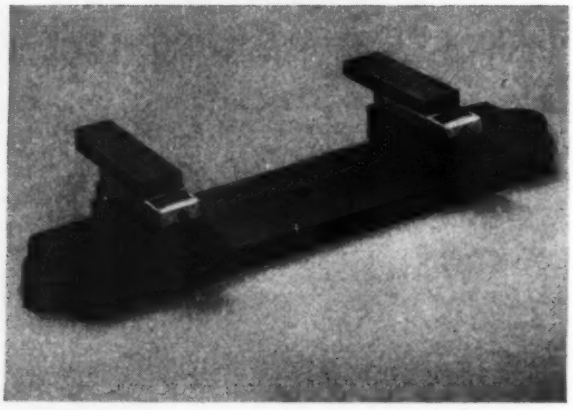
THE APPLETON MACHINE COMPANY • APPLETON • WISCONSIN

Eastern Sales: CASTLE & OVERTON, Inc., 630 Fifth Avenue, New York • Western Sales: PACIFIC COAST SUPPLY CO., San Francisco • Portland

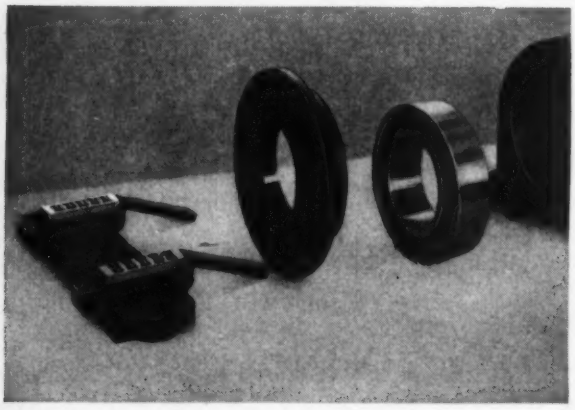
Paper and Felt Drier Cylinders Expand and Contract Freely on Torrington Ladder Bearing Mounting



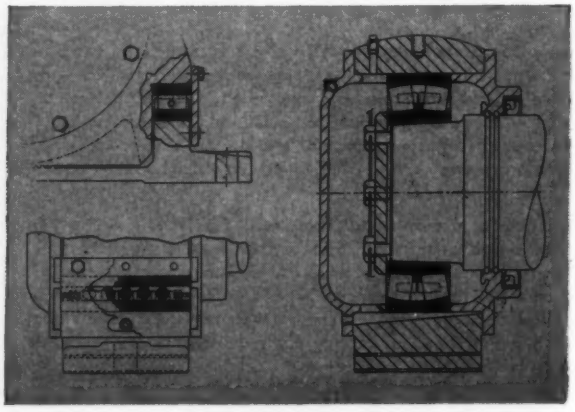
Many paper machine drier sections are being equipped for more reliable operation with the Torrington Ladder Bearing mounting for the tending side of paper and felt drier cylinders. In this design, the housing is free to move axially.



Two special Torrington Ladder-type Roller Bearings support the load with many times the capacity needed. Yet they leave drier cylinders free to expand and contract with anti-friction ease.

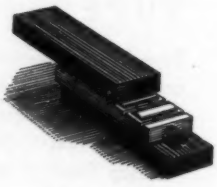


The combination with Torrington Self-Aligning Spherical Roller Bearings provides ideal operating conditions. One end of the shaft is fixed accurately, and proper alignment is automatically assured.



As this cross-section shows, all elements of the mounting work together to prevent the development of binding stresses from shaft deflection, frame distortion or cylinder expansion or contraction.

Reliable operation, low starting and running friction, reduced felt wear, and minimum maintenance are assured by this Ladder Bearing tending side mounting. Our engineers will be glad to work with you on details of this or any other special or routine friction problem. Write us today. THE TORRINGTON COMPANY, South Bend 21, Ind., or Torrington, Conn. District offices and Distributors in principal cities.

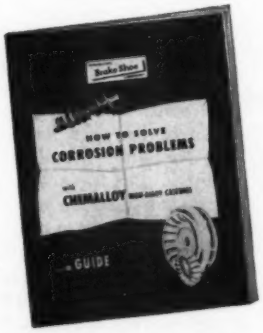


TORRINGTON BEARINGS

Spherical Roller • Tapered Roller • Straight Roller • Needle • Ball • Needle Rollers

GET THIS QUICK SELECTOR for CORROSION RESISTANT ALLOYS

Corrosive Media	Concentrations	°F	Chemalloy Grade	A28	A28M	A45	A52N	F12 P20	H1, 2	H3	H4	H 1 to 5 Hi-Resist
			AISI Types	302 304 347	316	310		410 442				
Hydrochloric Acid	All %	70		X	X	X	X	X	G	G	G	X
Hydrofluoric Acid	All %	Boil		X	X	X	X	X	G	G	G	X
	All %	70		X	X	X	F	X	F	F	F	X
	5%	70		G	G	X	G	X	F	F	F	X
Hydrogen Peroxide	Dry	70		G	G	G	G	G	G	G	G	G
Iodine	Wet	70		X	X	G	G	G	G	G	G	G
	All %	All		X	X	G	G	G	G	G	G	G
Lactic Acid	5%	70		G	G	G	G	G	G	G	G	G
Lead Acetate				G	G	G	G	G	G	G	G	G
Lead Nitrate				G	G	G	G	G	G	G	G	G
Lysol				G	G	G	G	G	G	G	G	G
Magnesium Carbonate	Conc.	70		G	G	G	G	G	G	G	G	G
Magnesium Chloride	5%			G	G	G	G	G	G	G	G	G
Magnesium Hydroxide				G	G	G	G	G	G	G	G	G
Magnesium Sulfate				G	G	G	G	G	G	G	G	G
Malic Acid				G	G	G	G	G	G	G	G	G
Mercuric Chloride				F	F	F	F	F	F	F	F	F
Mercurous Sulfate				G	G	G	G	G	G	G	G	G
Mercurous Nitrate				G	G	G	G	G	G	G	G	G
Milk	50-50 & 75-25	200 & 140		G	G	G	G	G	G	G	G	G
Mixed Acid	50-50 & 75-25	Boil		X	X	X	X	X	X	X	X	X
	70-10	Boil		X	X	X	X	X	X	X	X	X
Mine Waters				G	G	G	G	G	G	G	G	G
Naphtha	All %	All		G	G	G	G	G	G	G	G	G
Nitric Acid	All %	70		G	G	G	G	G	G	G	G	G
	Conc.	Boil		X	X	X	X	X	X	X	X	X
	Up to 65%	Boil		X	X	X	X	X	X	X	X	X
Oleic Acid				G	G	G	G	G	G	G	G	G
Oleum	All %	All		G	G	G	G	G	G	G	G	G
Oxalic Acid	10%	70		X	X	X	X	X	X	X	X	X
	10%	Boil		X	X	X	X	X	X	X	X	X
	All %	All		G	G	G	G	G	G	G	G	G
Phenol	All %	180		G	G	G	G	G	G	G	G	G
Phosphoric Acid	10%	70		X	X	X	X	X	X	X	X	X
	10%	Boil		X	X	X	X	X	X	X	X	X
	5%	70		G	G	G	G	G	G	G	G	G
Picric Acid				G	G	G	G	G	G	G	G	G
Potassium Chloride		70		G	G	G	G	G	G	G	G	G
Potassium Hydroxide	1-5%	Boil		G	G	G	G	G	G	G	G	G
Potassium Nitrate				G	G	G	G	G	G	G	G	G
Sea Water				G	G	G	G	G	G	G	G	G
Sodium Bicarbonate	10%			G	G	G	G	G	G	G	G	G
Sodium Bisulfate				G	G	G	G	G	G	G	G	G



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Wherever your products require stainless or other high alloys, you'll find an economical answer in one of the many grades of CHEMALLOY* corrosion resistant alloys.

This "Quick Selector"—included in our new Chemalloy bulletin—lists the common corrosive media in alphabetical order, with the specific Chemalloy grade recommended for each. Also shows AISI and ACI designations for standard Chemalloy grades.

We believe you'll find this bulletin a valuable guide to the selection of the right alloy for a given job. Write for your copy today. Electro-Alloys Division, 2024 Taylor Street, Elyria, Ohio. *Reg. U. S. Pat. Off.

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AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION
ELYRIA, OHIO

Safety . . . . . .

George DeCoster, guiding a winch as he goes about his work at Thilmany Pulp & Paper Co. He is in a happy mood after escaping serious injury in a recent accident because of his "Good Old Safety Shoes"

WEAR YOUR SAFETY SHOES!

The escape of a paper mill worker from what may have been disastrous results of an accident is graphically told in an article published in the August issue of *Thilco News,* published by Thilmany Pulp & Paper Company, Kaukauna, Wisconsin.

Under the heading "Safety Shoes Score Again," C. H. Kemp, Thilmany's director of safety, tells of the accident and the worker's escape, as follows:

" 'My safety shoe saved my foot from serious injury and certainly saved my toes from being smashed or amputated.' These were the thankful words uttered by George DeCoster after his recent accident. George works at Thilmany's Lower Mill with the Maintenance and Construction crews.

"This accident happened as George and two fellow workers were placing a metal door frame in position on a stock tank. George was standing on the third rung of a ladder when the frame, weighing 150 pounds, slipped from position and fell four feet. With considerable force, the frame pinned his right foot against the ladder rung.

"Fortunately for George, his safety shoe protective cap took the full force of the blow and prevented probable traumatic amputation of his toes. As it was, he did suffer a fracture of the great toe and considerable bruising of all the other toes, necessitating his present usage of a large and loose sandal.

"Yes, safety shoes have scored again, proving that *'safety always pays.'* Are you wearing your safety shoes today?"

▼

SAFETY CONGRESS PROGRAM SHOWS IMPORTANT SPEAKERS

When the 37th annual congress and exhibition of the National Safety Council opens in Chicago on October 24, it is expected that about 12,000 persons will be in attendance. The conference will last through the 28th, with more than 200 sessions on all phases of safety and more than 500 program participants. Highlighting the over-all program will be talks by important business leaders in some of the country's largest companies.

Sessions on industrial safety will be held at the Stevens, Congress, and Morrison hotels. The Congress Banquet will be held in the Grand Ballroom of the Stevens Hotel on Wednesday evening, October 26. Guest speaker at the banquet this year will be Eddie Cantor, outstanding stage and radio comedian. Mr. Cantor has long been an exponent of safety and has given of his time and talents to the cause in many ways.

Pulp and Paper Section

Headquarters of the Pulp and Paper Section will be in the Stevens Hotel. The meetings of this Section open with a session on Monday afternoon. The session on Tuesday afternoon will be devoted to addresses on safety subjects by men well known for their work in the Pulp and Paper Section. Wednesday afternoon will be given over to three round table discussions: Pulpwood Logging, Sulphite Pulp Manufacturing, and Sulphate Pulp Manufacturing. These discussions will be held simultaneously in different rooms.

A luncheon for the Section will be held on Thursday, at which time the National Safety Council awards and the Edward Benton Fritz Memorial Trophy will be presented.

Following the luncheon, the final business session will be held. This will consist of two round table discussions on Paper Manufacturing and Paper Products.

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▶▶▶ A NOTEWORTHY safety record has been recorded by the Menominee (Mich.) plant of Marathon Corporation, Menasha, Wisconsin. For the current fiscal year, this plant's frequency rate has been reduced to 3.30, and the plant, employing about 375, has operated since December 18, 1948, without a disabling injury.

▼

JOINT SAFETY COMMITTEE REPORTS ON QUESTIONNAIRE RESPONSE FROM 261 MILLS

The Joint Safety Committee formed earlier this year by the American Paper and Pulp Association and the American Pulp and Paper Mill Superintendents Association has just released its first report (Cf. P.I. and P.W., April, 1949, p. 84).

George J. Adams, chairman of the Committee, gives the following report on response to a questionnaire sent by the Committee to paper and pulp mills:

"Two hundred and sixty-one mills reported. Of these there were nine which completed the year 1948 without any lost-time injuries, giving them a frequency rate of zero. Sixty-five mills, or 24.9 per cent of those reporting, had frequency rates under 10.00, which indicates a very satisfactory experience. Other frequency rates soared to a high of 102.25!

"For the year 1948, the United States Bureau of Labor Statistics reported an average frequency rate of 19.3 for the paper and pulp industry. The average for mills replying to our request is 18.01. Therefore, any mill with a frequency rate of 19.3 or less might be considered better than average. On the

WHAT...LOWER YOUR

B.T.U. COSTS

IN THE FACE OF HIGH FUEL PRICES?

You Can!

With fuel costs sky high...with competition becoming keener daily...something *has* to be done to get more out of every available B. T. U....*and something can be done!*

Perhaps you *did* carefully survey your fuel economy a few years ago to determine whether an investment in heat exchanger equipment would be profitable.

Perhaps yours was a marginal case and you *did* find that the investment at that time was not warranted. Like others who have *recently* recalculated, however, today you may find that heat exchangers *can* lower your B. T. U. costs substantially...especially because of two noteworthy developments.

1. A vast research program at Ross has boosted the heat conserving performance of traditionally efficient Ross Exchangers.
2. Wide spread Ross standardization has brought about low unit cost.

In combination, these industry-leading feats have, for comparatively nominal investments, pulled down B. T. U. costs for many a plant by eliminating needless and costly waste. This applies not only to first-time users of exchangers, but long-time users as well who are now finding that adding Ross equipment pays off...*quickly!*

Ross Heater & Mfg. Co., Inc., Div. of American Radiator & Standard Sanitary Corp., 1430 West Ave., Buffalo 13, N. Y. In Canada, Horton Steel Works, Ltd., Fort Erie, Ont.

★ Whether or not you have made a recent heat consumption survey, why not consult a Ross heat exchanger engineer now? No obligation in finding out from him how to increase the B. T. U. return from every fuel dollar you spend.

ROSS

EXCHANGERS ... *MAKE OTHER PRODUCTS BETTER*

Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON

other hand, when comparing this B.L.S. rate with that of other industries, it cannot be considered a satisfactory rate. To avoid the criticism of maintaining unsafe working conditions in the paper and pulp industry, a marked improvement is needed.

"The Committee wishes to emphasize that the subject of safety should be of primary concern to management and suggests that, particularly in plants where the experience has been unsatisfactory, the situation be approached with a vigorous effort to enlist the interest and co-operation of the entire plant personnel to bring about a substantial reduction of accidents in future experience."

▼

TWO-YEAR RECORD WITH NO LOST-TIME ACCIDENT FOR GAYLORD (BOGALUSA)

In recognition of more than two years and 1,072,900 man-hours of operation without a lost-time accident, employees of Gaylord Container Corporation, at the Bogalusa, Louisiana, bag plant, have received Liberty Mutual Insurance Company's Accident Prevention award. This outstanding industrial safety record was established between May 1, 1947, and May 18, 1949.

The blue and white flag, symbolic of the award, was presented at recent ceremonies by T. A. Moore, Jr., Liberty Mutual engineer, to C. L. Kunick, superintendent of the bag plant. Executive Vice President Vertrees Young, of Gaylord Container Corporation, said that the flag is a measure of the effort put forth by all people in the plant, and that it was by their effort that the plant was made a safe place in which to work. Supervisor F. M. Ashbridge, of Liberty Mutual, congratulated the assembled employees and suggested that they take home the safety lessons learned at the plant to make their homes equally safe..

▼

INGERSOLL STEEL WORKS MILLION MAN-HOURS WITH ACCIDENT-FREE RECORD

One million man hours of work without a single accident serious enough to cause an employee to take time off were recently completed at the Chicago plant of the Ingersoll Steel Division of Borg-Warner Corporation. These accident-free hours were worked during the last five and one-half months.

A safety program "tailor-made to fit the individual plant, the individual department and the individual employee" is carried out through close co-operation between employees and management, J. A. White, works manager, said. Instead of relying on general industrial safety regulations, each employee and each job in the plant is recognized as presenting a specific safety problem. Top management interests itself in the safety of individual workers rather than leaving the task to foremen alone.

The interest of the employees in their own safety is stimulated by a "personalized" educational program conducted by the personnel manager, M. H. MacMillan. "To Make Safety Last, Put Safety First" is a plant slogan. Employees are invited to make their own safety suggestions and to contribute safety slogans.

If an employee is injured even slightly, a description of the occurrence is posted on bulletin boards, showing how the accident happened and how it might have been avoided. Similarly, when what might have been an accident is avoided through an employee's having taken the proper safety precautions, that case also is publicized on the bulletin board.

Through the years mill experience has proven that the Morden "Stock-Maker" excels for fiber beating.

Each year gives additional evidence of its versatile and efficient beating and refining treatment in many types of pulp and grades of paper.

For the last twelve years the basic and outstanding principles of Morden treatment have not changed. However, we are constantly on the alert to even further improve its mechanical features. For instance, we have recently made improvements such as:

1. Adding a lantern ring in the packing gland.
2. Providing a copious oil reservoir by enclosing both the thrust and radial bearing in a one-piece cartridge.
3. Adding an integral coupling guard.
4. Adding a generous clean out sump for tramp metal.
5. Adding a plate with all basic operation and maintenance instructions directly on the machine housing.

Let us explain "What's New" in Morden uses and how the "Stock-Maker" can further improve your beating and refining operation.

MORDEN MACHINES COMPANY
PACIFIC BUILDING • PORTLAND 4, OREGON

In Canada
The William Kennedy & Sons, Ltd. Owen Sound, Ontario

In England
Millspaugh, Limited, Sheffield

APPLETON *Felts*

FOR DESIGN AND FINISH!

FOR UNIFORMITY!

FOR SERVICE!

FOR DEPENDABILITY!

APPLETON, WISCONSIN

APPLETON WOOLEN MILLS

Associations

NEW PAPER GROUP FORMED IN CLEVELAND—TO HOLD REGULAR DINNER MEETINGS

A number of TAPPI members and friends in Cleveland have formed a group which they have tentatively named Lake Erie Papermakers' and Converters' Association. Anyone interested in paper or paperboard manufacture or conversion will be welcome.

A series of dinner meetings has been scheduled to be held the first Friday of each month during the coming winter. A symposium on paper and paperboard finishes has been selected as the subject for the first of these meetings which will be held at the Hickory Grill, 929 Chester Avenue, Cleveland, on October 7. Cocktails will be available before the dinner which will be served at 7:15; the meeting will start promptly at 8:15.

Speakers for the first meeting will include representatives of a machine building, a paper or board mill, and an ink supplier. A question and discussion period will be held following the presentation of papers. Paper testing has been selected as the subject for the November meeting.

Further information on the activities of this group may be obtained from: Bill Manor, Consolidated Paper Company, Monroe, Michigan; Pete Spring, Chase Bag Company, Chagrin Falls, Ohio; Bill Schoenberg, 1200 W. 9th St., Cleveland 13, Ohio; or Lew Burnett, Ohio Boxboard Company, Rittman, Ohio.

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▶▶▶ GENERAL OFFICES of the Georgia Forestry Association have recently been moved from Savannah to Atlanta, according to a recent announcement. The new offices are in the Capitol building where the offices of the Georgia Forestry Commission and the U.S. Forestry Service are located.

▼

FIELD TRIPS WILL FEATURE AMER. FORESTERS MEETING

A new feature of the national meeting of the Society of American Foresters scheduled for October 11, 12, and 13, at the Olympic Hotel in Seattle, Washington, will be specially arranged field trips, both before and after the three-day technical sessions.

Among the field trips planned for Monday, October 10, and Friday, October 14, are one to the Snoqualmie National Forest's White River tree farm and another to Seattle's well-known Cedar River watershed. General sessions devoted to forestry in the Pacific Northwest will occupy the mornings of October 11 and 13. Scheduled for October 12 are subject division meetings; and the annual banquet, at which Washington's Governor Arthur B. Langlie will speak, is to be that evening.

On Saturday morning, October 15, dedication of the Gifford Pinchot National Forest (formerly the Columbia National Forest and renamed in honor of the first president of the Society) will be held near Packwood, Washington.

Membership of the organization now totals 6,500 technically trained foresters in the United States and Canada.

▼

TWO LABORATORIES ARE ADMITTED TO MEMBERSHIP IN CERT. PULP TESTERS

The Certified Pulp Testers Bureau, New York, has announced the approval and addition to its list of commercial laboratories, the following:

The Gulick-Henderson Laboratories, 231 South Dearborn Street, Chicago 5, Illinois (formerly represented by Everett J. Schwantes, resigned).

John H. Sutliff, Font Grove Road, Slingerlands, New York (formerly with A.P.W. Products Company, Inc., Albany, New York).

The Bureau is supported by the American Paper and Pulp Association, Association of American Wood Pulp Importers, and the Technical Association of the Pulp and Paper Industry.

▼

DISTINGUISHED SPEAKERS ON PROGRAM FOR TIME AND MOTION STUDY CLINIC

Nationally prominent leaders of labor, management and government will tell the story of the economic outlook during the 13th Annual Time and Motion Study Clinic to be held at the Sheraton Hotel, Chicago, November 2, 3, and 4.

Sponsored by the Industrial Management Society, the Management Clinic will bring together more than 4,000 industrial executives, plant operators and supervisors who will discuss methods and means of winning the "cold war" on industrial inefficiency. Charles Sawyer, Secretary of Commerce, and Adlai Stevenson, Governor of Illinois, will speak. Ralph H. Landes, Western Electric Company, is General Conference Chairman, and William S. Wheeler, Western Editor of *Factory Management and Maintenance*, is Program Chairman.

▼

COMING EVENTS

Sept. 22-24—Northeastern Div. Superintendents Association, Fall Meeting, Poland Spring, Maine.

Sept. 26-29—National Paper Trade Ass'n, Fall meeting, Stevens Hotel, Chicago.

Sept. 30-Oct. 1—New Jersey-Delaware-Pennsylvania Div. Superintendent Association, Fall Meeting, St. Patrick's Inn, Mt. Pocono, Pa.

Oct. 1—Connecticut Valley Div. Superintendents Association, Red Lion Inn, Stockbridge, Mass.

Oct. 4-5—Northwestern Div. Superintendents Association, Fall Meeting, Hotel Duluth, Duluth, Minn.

Oct. 4-7—Society of Industrial Packaging and Materials Handling Engineers, Fourth Annual Exposition, Convention Hall, Detroit, Mich.

Oct. 10-14—West Coast Meeting, American Society for Testing Materials, Fairmont Hotel, San Francisco, Calif. (First national meeting of ASTM on West Coast.)

Oct. 11-13—National Meeting, Society of American Foresters, Olympic Hotel, Seattle, Wash.

Oct. 14-15—Southeastern Div. Superintendents Association, Hotel Roanoke, Roanoke, Virginia.

Oct. 24-26—Southern Div. Superintendents Association, Fall Meeting, Frances Hotel, Monroe, La.

Oct. 24-28—Annual Safety Congress and Exposition, National Safety Congress, Chicago.

Oct. 31-Nov. 3—TAPPI, Engineering Conference, Statler Hotel, Boston, Mass.

Nov, 1-5—Pacific Chemical Exposition, California Section, American Chemical Society, Civic Auditorium, San Francisco, California.

1950

Jan. 16-19—First Plant Maintenance Show, Auditorium, Cleveland, O.

STATED MEETINGS

Chicago section of TAPPI meets the third Monday of each month at the Chicago Bar Association, Chicago, Ill. First meeting of the season will be held Sept. 19.

A group of TAPPI members and friends in Cleveland will sponsor a series of dinner meetings to be held on the first Friday of each month during the coming winter. The name tentatively chosen for this group is Lake Erie Papermakers and Converters Association. First meeting on Oct. 7 will be held at Hickory Grill, 929 Chester Ave., Cleveland, Ohio.

A versatile valve for general service . . .

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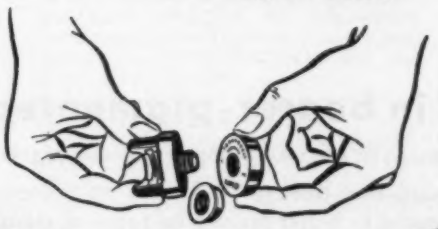
Figure 123

N - M - D

NON - METALLIC - DISC

150 lb. S.P.
300 lb.W.O.G.

The valve with the quick-change disc



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AIR AND GAS • GASOLINE • OIL • BUTANE • PROPANE

N. M. D. and other Lunkenheimer Valves are available in all industrial centers. You can depend upon your Lunkenheimer Distributor for prompt service on your requirements.

Fig. 123 is an exceptionally rugged valve . . . available with various types of discs especially compounded to give top results on the services for which they are recommended. Discs can be renewed or interchanged quick as a wink, insuring long-time satisfactory valve service with negligible maintenance expense. Disc holder is slip-on type, perfectly guided. Hexagon head gland is an aid to easy repacking. A further economy feature is the distinctive long-wearing stem material developed by Lunkenheimer, eliminating stem-thread failure due to wear.

The "N-M-D" valve is also regularly available in angle, check and quick operating patterns. Circular No. 558, descriptive of the complete line, is yours for the asking.

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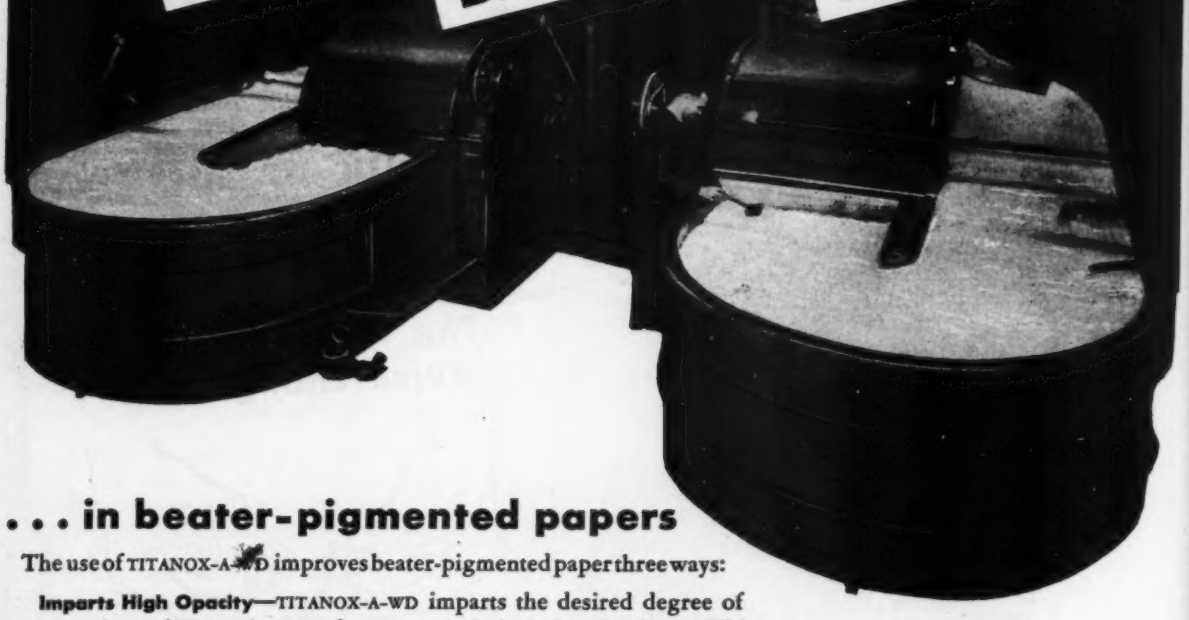
TITANOX-A-WD

assures

high OPACITY **lasting BRIGHTNESS** **normal STRENGTH**



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The use of TITANOX-A-WD improves beater-pigmented paper three ways:

Imparts High Opacity—TITANOX-A-WD imparts the desired degree of opacity to beater-pigmented paper at relatively low loadings. This pigment prevents the overloading of light-weight papers which may occur with lower opacity fillers.

Promotes Lasting Brightness—The initial high brightness and whiteness secured through this pigment are retained because TITANOX-A-WD is not only color stable but almost masks after-yellowing.

Maintains Strength — The addition of abnormally high amounts of ordinary mineral filler to secure comparable opacity often weakens the paper. The relatively small amount of TITANOX-A-WD necessary for a given level of opacity does not affect the normal strength of the paper.

Our Technical Service Laboratory is available to help you to improve your paper with TITANOX-A-WD. Write or phone our nearest office. Titanium Pigment Corporation, 111 Broadway, New York 6, N.Y.; 104 South Michigan Avenue, Chicago 3, Ill.; 2600 South Eastern Avenue, Los Angeles 22, Calif. Branches in all other principal cities.

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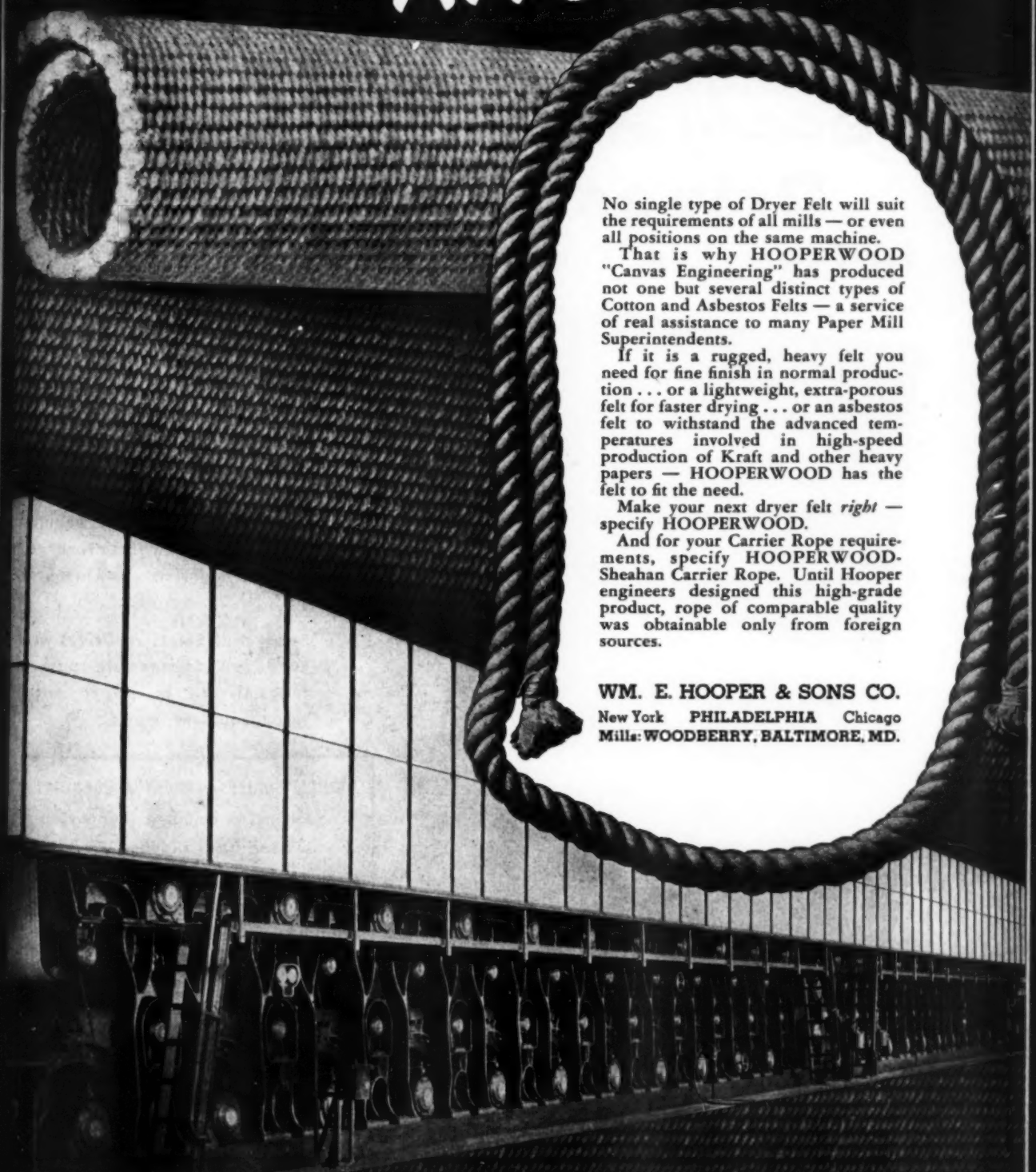
WHAT EVERY PAPER MAKER KNOWS...



No single type of Dryer Felt will suit the requirements of all mills — or even all positions on the same machine.

That is why HOOPERWOOD "Canvas Engineering" has produced not one but several distinct types of Cotton and Asbestos Felts — a service of real assistance to many Paper Mill Superintendents.

If it is a rugged, heavy felt you need for fine finish in normal production . . . or a lightweight, extra-porous felt for faster drying . . . or an asbestos felt to withstand the advanced temperatures involved in high-speed production of Kraft and other heavy papers — HOOPERWOOD has the felt to fit the need.

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HOOPERWOOD DRYER FELTS

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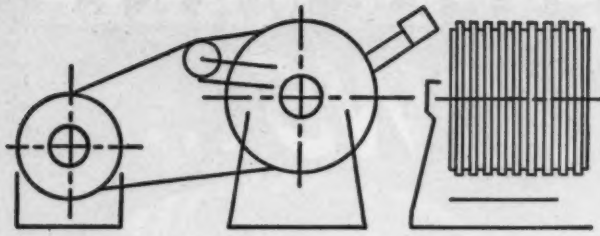
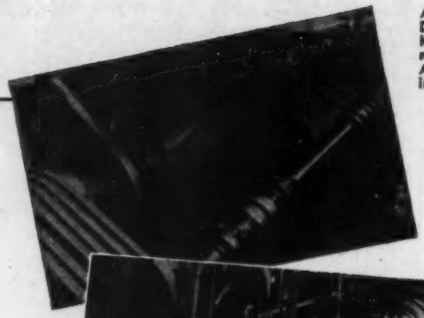
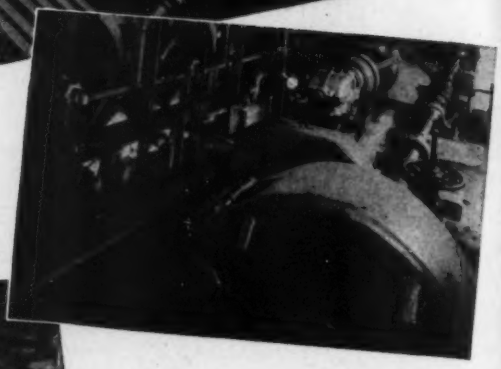
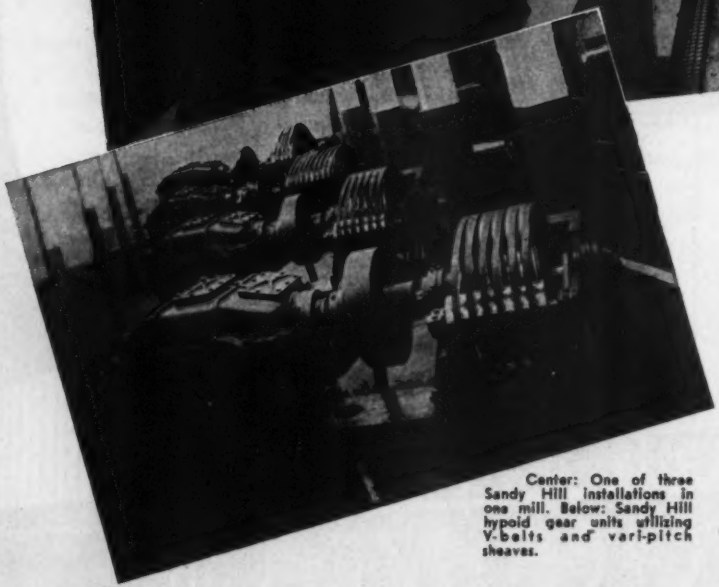


At left: Selective Drive on Sandy Hill high grade tissue machine. Below: Another Sandy Hill installation.



Sandy Hill
Drives
for Power...for Control





Center: One of three Sandy Hill installations in one mill. Below: Sandy Hill hypoid gear units utilizing V-belts and vari-pitch sheaves.

Sandy Hill Selective Drives provide the perfect answer to the major requirements of paper machine operators. They provide unvarying draw between sections, fineness of draw regulation, exact draw maintenance, simplicity, efficiency and low first cost.

Sandy Hill Selective Drives are used for dependable power transmission in paper mills throughout the world.

HIGHER QUALITY—GREATER ECONOMY

In addition to complete Paper Machines, Sandy Hill supplies a variety of outstanding equipment specialties designed to increase efficiency at important points. A partial list appears at the bottom of this page. We invite your inquiry.

Sandy Hill Iron & Brass Works

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Some Leading Items:

Fourdrinier Paper Machines
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Dandy Roll Drives
Quick Opening Gate Valves
Scofield Felt Conditioners
Cleveland Type Bearings
Castings—Iron, Bronze, Aluminum
"Packer" Screens
Shaker Screens
Nelson Slice
Nilsa Bag Machines
Nilsaton Printing Presses

Practical Shorts . . . . .

Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

Pressure Headbox

Since the invention of the fourdrinier machine for making paper in a continuous web, great strides have been made in improving the machine itself—in increasing speeds and automatic controls. However, one of the most important components, the headbox, has been merely extended in height for velocity spout in conjunction with the speed that the web travels.

Too little thought has been given to improvement on the headbox itself, since the usual thought and practice is to strive for uniformity of flow from the orifice and keep down flocculation of fiber in the headbox. Little study has been made of fiber suspension during the flow from the common type of headbox. As paper machines are speeded up, it is the usual practice to add baffles, perforated plates, perforated rolls and racks to maintain uniformity of flow on the web, and at given speeds a peak is reached whereby quality production is satisfactory. If any change in the speed occurs from this peak, the same problem exists due to a change of fiber suspension or displacement when using the common type of headbox.

In theory, a given number of inches in height will correspond with a given number of feet per second in velocity flow from the orifice. As the height of the head is increased in the common type of headbox, the flow through stationary baffles, perforated plates, and constant speed perforated rolls changes the fiber suspension in the mix to the extent of affecting quality production. To change this condition, numerous machinery builders are working on pressure type boxes that will deliver the same fiber mix and suspension under varying speed conditions.

The pressure box herein described was designed with the idea of achieving a uniformity of flow and fiber suspension with a maximum water removal on the web. However, this pressure box is not in operation at present, but the results achieved during the experimental stage were encouraging enough for the author to patent this principle of flow under pressure.

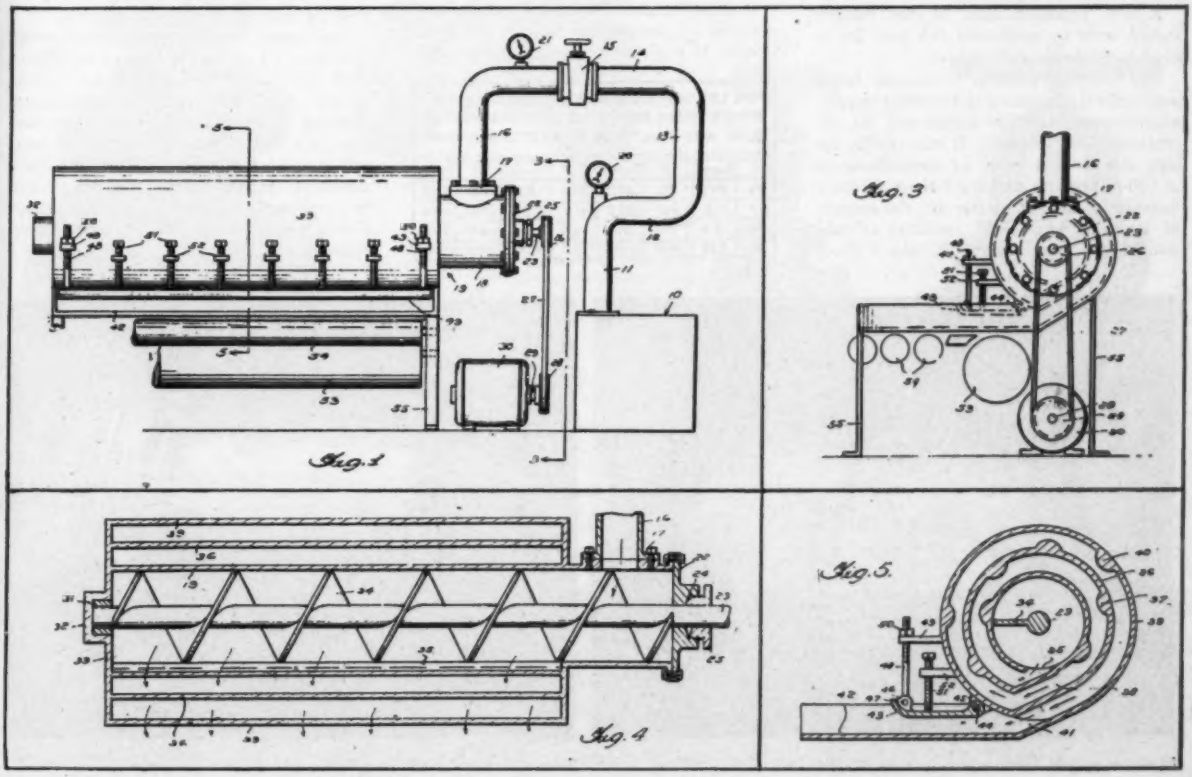
By taking a mixture of any given per cent of fiber and water and pumping it through the central chamber with the perforated helix under pressure, it was found that a consistency of fiber and water varied less than .0001 per cent at any interval. Thus by providing a circular channel flow with oval baffles, the fiber was held in suspension similar to the results of the mixing pump, and at the discharge orifice no variation was found in the flow. Note the curvature of the slice lip; this was found to be the most efficient slice lip for discharge, due to the release of the flow in a manner that no direct friction was noticeable and no developed cross-currents occurred. However, this lip is adjustable and a cross flow control is possible without affecting the suspension of fibers. This box will eliminate flocculation of fiber, accumulation of slime, and make continuous slime treatment more efficient. It can be constructed much smaller in proportion than the common upright headbox. Also it can be designed for any volume of mix and constructed out of a stainless clad material at a minimum expense. In the event that it is used as a secondary box, it would minimize the problems of handling and yet insure a more uniform mix and flow and would greatly improve on water removal due to its uniformity.—WILLIAM PATRICK SHANNON, Macon Kraft Co., Pat. #2451305.

▼

It Does Not Pay to Overbelt

"Should we overbelt our drives?" is a question that is commonly asked by belt users because we have so often been told, "Be sure to use belts and pulleys that are amply wide and thick. It does not pay to use belts that are too narrow or too thin."

The correct answer to the question usually is "No." It does not pay to overbelt for much the same reason that it does not pay to overdo numerous other things including overeating, overdrinking, overtalking, overexerting, and so on. Perhaps ninety times



out of a hundred, when the question is similar to the above, the correct answer is "No."

But is does not pay to underbelt either. Of the two, underbelting is less desirable than overbelting. To derive maximum pay from belts, drives should be belted "just right"—neither over nor under—which, to be sure, is often a difficult prescription to fill.

In line with the above, another question frequently asked is, "What factor of safety should be used in designing our belt drives?"

The answer to that is: Belting is not given a factor of safety by our best belt drive designers. The aim is to keep stresses below the elastic limit at all times, on shock drives as well as on steady drives. It is considered all right for the stress to "almost" touch the limit of elasticity without actually hitting it, which, in engineering parlance, means that belting is virtually given a factor of safety of unity. This is perhaps the lowest safety factor applied to any engineering material aside from shear bolts and pins which are purposely intended to break as soon as the dangerous load is reached.—W. F. SCHAPHORST, M.E.

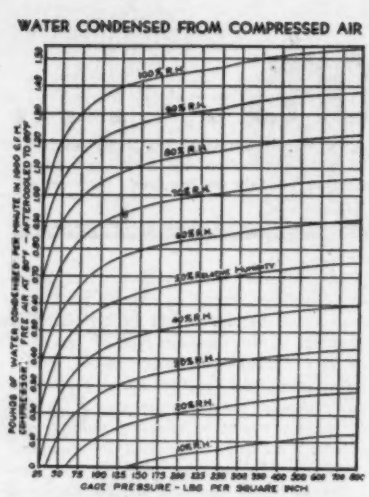
▼

Moisture in Compressed Air Can Be Avoided

Applying the chart (illustrated) to their own systems, operators of compressed air systems may find they are condensing far more moisture than they realize. This surprisingly large volume of condensation which takes place is sufficient to wash lubricant out of pneumatic tools, cause corrosion and rusting of parts, dilute paint spray mixture and generally cause a heap of operating and maintenance troubles in all air operated equipment.

A few pertinent facts on the subject should serve to emphasize the need for a good moisture removal system.

The moisture problem is brought home more fully in the spring and summer months when temperatures are higher and the air contains more moisture. It can readily be seen that since 1 cu ft of compressed air at 100-lb pressure contains 7 times as much moisture as 1 cu ft of free air, the amount of moisture which will condense is substantial. Or more specifically take a thou-



NOTE: Amount of water condensed is in direct ratio to compressor rating, i.e., for 500 cfm compressor multiply determined amount of condensate by 0.50; for 200 cfm compressor, multiply amount of condensate by 0.20

sand cu ft of free air at sea level atmospheric pressure, 80 Fahr temperature and a relative humidity of 100 per cent. This air would contain 1.58 lb of moisture. Compressed to 100 psi and cooled back down to entering air temperatures, 87 per cent of this moisture would be condensed out. If you are operating a 1000-cfm compressor under these conditions, approximately 10 gal of water per hour will be condensing in your system.

The above example, while unusual, nevertheless serves to indicate that important amounts of moisture will condense, particularly when humidities are high.

Reasons behind the large watermaking potential of compressed air are relatively simple. If a given volume of saturated air is compressed to 1/5 that volume, it's logical that 4/5 of that moisture will condense out, providing the temperature remains constant. However, the heat of compression raises the temperature substantially, thereby increasing the air's moisture carrying capacity. After leaving the compressor, the air gradually cools, its moisture carrying capacity drops and water is condensed out in the receiver and throughout the system.

One solution, therefore, is to cool the air quickly, before it goes into the distribution system. This can be accomplished by equipping the system with an adequate aftercooler which will cool the heated compressed air back down to within about 15 degrees of entering air temperature. A suitable air trap should be installed to automatically drain the water which is condensed in the aftercooler. Similar traps should be installed on the receiver and at drip points in long air lines to take care of any moisture accumulation resulting from further cooling of the air.—From *Armstrong Trap Magazine*, published by ARMSTRONG MACHINE WORKS.

FOR LBS. WATER CONDENSED AT TEMPS. OTHER THAN 80°F, FIND WT. CONDENSED AT 80°F. AND MULTIPLY BY FACTORS SHOWN

°F	Factor	°F	Factor	°F	Factor	°F	Factor
10	.070	50	.373	100	1.81	140	5.15
20	.112	60	.525	110	2.39	150	6.58
30	.176	70	.729	120	3.12	160	8.19
40	.259	90	1.35	130	4.02	170	10.2

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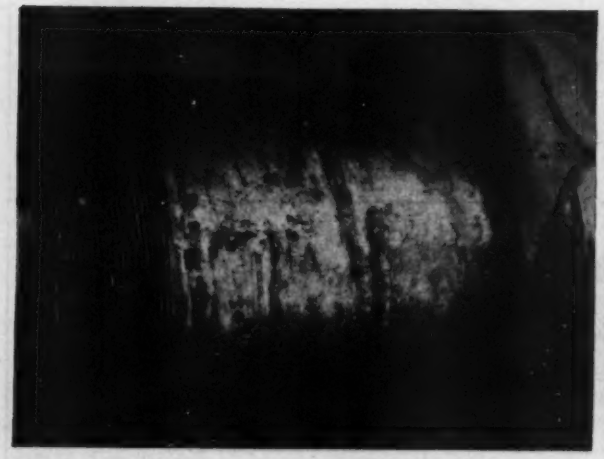
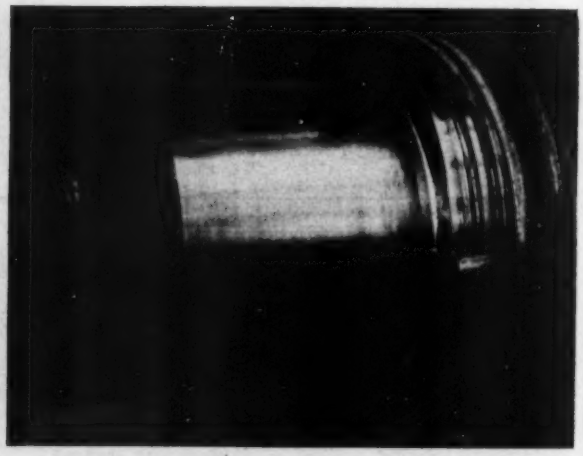
Metallizing Saves Money In Journal Repairs

A large Canadian paper mill uses nine 18-ton vacuum rolls, 30 in x 248 in, with 10.829 dia x 23¼ in antifriction bearing journals at both ends. Previous practice in repairing these damaged journals involved turning down their diameters and fitting with undersize split sleeves in the bearing races. This method was never considered satisfactory since the sleeves were not interchangeable and cause much wasted time and confusion every time one had to be replaced. Eventually, repeated turning down of the diameters would have meant scrapping the journals and replacing them.

One journal repaired by the old sleeving method cost $102.00 for material and labor. With metallizing the total cost per journal is less than half, including preparation, spraying, finishing, labor and materials. Savings on a single repair job for all 16 journals amount to $1,003.30, and since their diameters are not reduced the process can be continued indefinitely.—From *Metco News*, published by METALLIZING ENGINEERING CO., INC.



Badly damaged vacuum roll journal BEFORE metallizing



Same journal AFTER metallizing and finishing

That's right! POWELL VALVES *really cut maintenance costs*

Every day, *the cost of production* is becoming a more important factor . . . and *maintenance* is a major item.

Take, for example, the cost of maintaining flow control equipment. By installing Valves that are properly designed and made of materials best suited to meet the exacting requirements of the service in which they are to be used, you not only save in the amount of wages paid out to maintenance crews, but you avoid costly shutdowns with consequent loss in production.

To build valves that give longer, trouble-free service has always been and is a prime consideration of Powell Research and Engineering. That's why it pays to standardize on *Powell Dependable Valves*. Ask your nearest Powell Valve Distributor—or write direct.

Fig. 1816—Large 125-pound All Iron Gate Valve. Made in sizes 2" to 30", incl. Has outside screw rising stem, bolted flanged yoke and tapered solid wedge. Tapered double wedge can be provided in sizes 2" to 12", incl.

Bellows Sealed "Y" Valve. Powell's Bellows Sealed Valves—Globe and "Y" patterns—are designed for high vacuum service and for installations where packing is unsatisfactory or fails frequently. The bellows is enclosed within the valve body, completely sealing the interior of the valve from the outside atmosphere. Available in 18-8S, 18-8S Mo., Monel Metal, Hastelloy, in sizes ¼" to 12", inclusive. ←

Fig. 1708—200-pound Bronze Globe Valve with screwed ends, union bonnet, renewable, specially heat treated stainless steel seat and regrindable, renewable, wear-resisting "Powellium" nickel-bronze disc. →

Fig. 457—125-pound All Iron Globe Valve with outside screw rising stem, bolted flanged yoke and regrindable renewable iron seat and disc.

Powell Valves are made in Bronze, Iron, Steel and a wide selection of Corrosion-Resistant metals and alloys. Valves of every type—Globe, Angle, Gate, Check, Non-return and Flush Bottom Tank Valves—are included in the Complete Powell Line.

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POWELL VALVES

Electrical Evaporation of Waste Sulphite Liquor*

L. R. BEATH and H. S. HILL

ABSTRACT: A new method of evaporating waste sulphite liquor by using electrical power is described. The process[1] was extensively tested on a small pilot plant scale in units having evaporative capacities up to two and a half tons of water per day. The method, and the apparatus finally developed, are considered suitable for commercial scale evaporation of waste sulphite liquor. The economics of the method are very favorable where secondary electrical power is available for the evaporation and the concentrated waste liquor is used for fuel.

The recovery of economic values from the waste liquor of the sulphite pulping process has been a challenging problem to the sulphite industry since its inception. Stream pollution by these wastes is an increasingly critical problem. Many possible uses for waste sulphite liquor are known, some of which are part of current economic practice. However, only one economical use for waste liquor is now known which will absorb more than a minor fraction of the total production. This use, of course, is burning as a fuel after suitable concentration.

Waste sulphite liquor has been evaporated and burned in Scandinavia for many years. Our impression of Scandinavian experience is that concentrated or dried waste liquor is an excellent fuel, but that its evaporation is an expensive affair which is economical only where the cost of other fuels is high. The difficulty in evaporation, of course, largely results from the acute tendency of calcium-base waste liquors to deposit hard, insulating scale on the heat transfer surfaces of evaporators. Scale removal costs, and the need to provide extra heat transfer surface to compensate for reduction of heat transfer rates with scaling, have been major deterrants to the evaporation and burning of waste sulphite liquor.

Economical evaporation of calcium-base waste liquor thus depends upon finding solutions to the problem of scale formation. A chance query as to whether waste sulphite liquor might be evaporated in electric water boilers suggested to the Research Department of Price Brothers and Company Limited a possible answer to the scaling problem. By providing the heat required for evaporation by passing an electrical current through waste liquor, heat transfer surfaces would be eliminated, and with them might go the troublesome scale. By doing the evaporation at a pressure sufficiently high that the steam could be used for cooking pulp or other purposes, the energy supplied for evaporation can be efficiently recovered. If low cost, secondary, or boiler, electrical power is used, net power cost for evaporation would be approximately zero, since it would be balanced by an equal credit for the steam produced. Thus, a very low cost concentrated waste liquor would be produced for fuel or other purpose. On first consideration, therefore, the general principles of electrical evaporation seemed sound, and a research program was set up to study the factors involved in the commercial application of the broad idea. At the time this project was begun secondary power was available in our district and its continued availability was expected.

The first question to be answered was: What is the electrical conductivity of waste sulphite liquor over the range of concentrations and temperatures in which we are interested? Upon the answer to this question depended the critical factors of dimensions of apparatus, and voltage to be used.

The conductivity of waste sulphite liquor was found to be very uniform from sample to sample at all temperatures and concentrations, providing the variable content of free sulphur dioxide was boiled off before testing. Representative data is shown in Figure 1. It may be well to say here that these data are of an industrial, rather than a scientific degree of accuracy and precision. At the operating conditions we tentatively selected, namely, 150 psi steam pressure and 50 per cent solids concentration, the specific conductance of waste liquor is about 0.035 reciprocal ohms per cc, while water in our electric boilers has a specific conductance of 0.001 reciprocal ohms. Thus, if waste liquor were used in our electric boilers, power input would be over thirty times normal, or nearly 1,000,000 horsepower! Suitable power capacity in water boilers using waste sulphite liquor might be had by use of low voltages, but the attendant higher amperages bring other disadvantages. In addition, it was felt that water boilers would not provide adequate steam disengaging surface for waste sulphite liquor, which has a strong tendency to foam. It was therefore necessary to design equipment specifically for the evaporation of waste sulphite liquor.

(*) Paper presented at the 1949 Summer Meeting of the Technical Section of the Canadian Pulp and Paper Association, held at the General Brock Hotel, Niagara Falls, Ontario, June 1-3, 1949. (Published here *in toto*)

(1) The process and apparatus are patented in the United States, and patents are pending in Canada.

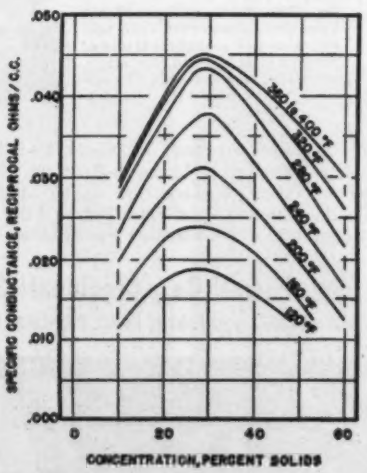


Fig. 1—Specific electrical conductance of waste sulphite liquor vs. liquor concentration at various temperatures

At this stage an informal arrangement was made between Foster Wheeler Limited and Price Brothers for jointly exploring the possibilities of electrical evaporation of waste sulphite liquor. H. O. Goddard of Foster Wheeler and the Research Department of Price Brothers collaborated on the preliminary designs of the equipment tested, which was provided through the kindness of Foster Wheeler. The testing of apparatus and process was done by Price Brothers Research Department.

Evaporator No. 1

A number of possible evaporator designs were considered before settling on the type finally built for first trial. The general construction of the unit may be seen in Figure 2, in which *A* is the evaporating chamber; *B*, the circulating pump; *C*, a tubular heat exchanger; *D*, rate of circulation flowmeter; *E*, the condenser for steam from the evaporator; and *F*, the reservoir for dilute feed liquor. Figure 3 is a section of part of the evaporator proper. Liquor from the circulating pump enters at 1 and flows past the bowl 2 which is a grounded electrode. The ceramic nozzle 3 and adjustable needle 4 form the liquor into a jet which passes through the opening in the high voltage electrode 5 and impinges on the center of the ceramic deflector 6 from which it falls as a cylindrical curtain into the electrode. The liquor overflowing the electrode drops to the grounded splash plate 7 and so returns to the base of the chamber from which it again flows to the circulating pump.

There are two electrical current paths; the first, from the high voltage electrode 5 by way of the liquor stream across the deflector, down the rising jet, through the nozzle to the grounded electrode 2; and the second, from the high voltage electrode through the liquor stream dropping on the grounded splash plate. In operation of this unit, the liquor circulating to the electrodes is kept at the concentration desired for the final product, usually 50 to 60 per cent solids content. Dilute feed liquor is added at such rate as to keep the level constant in the evaporator, and concentrated liquor is drawn off from time to time as required to maintain the proper product concentration. This unit was designed for 25 kw at 2200 v to evaporate about 100 lb of waste liquor per hour.

Preliminary tests on the electrical and hydraulic characteristics of the unit were made using solutions of common salt. These were followed by tests with waste liquor in which evaporation was done with heat from the steam-supplied heat exchanger while running conductivity tests on the jets. As a result of changes made in this phase of the work, electrical evaporation was started using 1100 v.

The people who started the first atomic pile reaction probably felt some of the trepidation we did at the moment the starter button was first pushed to connect our apparatus to the 1100-v transformer. However, nothing happened except that the waste liquor got warmer, hot, and finally boiled, and we found ourselves evaporating waste sulphite

Important points to know about COTTRELL *Electrical Precipitators*

A COTTRELL Electrical Precipitator is a major plant investment. Once installed it is operated over a period of many years, *thus multiplying year after year the benefits of top notch design and installation.*

And because of the many factors affecting the operating and collecting efficiency of a COTTRELL Precipitator, probably in no other field do the experience and "know-how" of the organization designing and installing the unit play a more important role in influencing the overall performance of the installation. That is why it is so important to remember this fact . . .

Western Precipitation Corporation is the organization that installed the first successful COTTRELL *Precipitator over 39 years ago, still operating efficiently . . . and has consistently developed new refinements, new techniques, new applications that today have made it world famous in the science of recovering dusts, fly ash, mists, fogs and other suspensions from gases.*

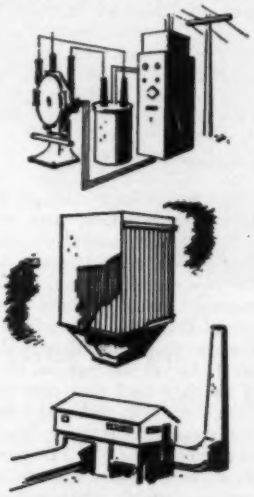
This is the first of a series of advertisements briefly outlining the important elements that go to make up a COTTRELL installation. Only long experience coupled with highest engineering ability, can assure the proper combination of these elements into a COTTRELL installation best suited to *your particular requirements*!

Basically, a Cottrell Precipitator consists of three major divisions each in turn consisting of many separate elements . . .

1. THE ENERGIZING SYSTEM, as its name implies, is the portion of the unit wherein the power is brought in, the voltage stepped up, then rectified to provide the unidirectional high voltage current supply for the Electrode System.

2. THE ELECTRODE SYSTEM consists of the high-tension ionizing electrodes and collecting electrodes through which the suspension-laden gas is passed to be cleaned. These electrodes can be of various designs, shapes and patterns and are equipped with various "rapper" arrangements which assist in keeping the electrodes clean of recovered materials.

3. THE HOUSING OR SHELL includes the structure containing the Electrode and Energizing Systems as well as the gas ducts and distributing system, the hoppers for receiving the collected material and other miscellaneous equipment.



Each of these three major divisions, together with their many individual parts, must be carefully engineered into ONE integrated and precisely-balanced unit to provide the successful and continuously-operating COTTRELL Precipitator. This series will take these major units apart to show in greater detail how the individual parts function and the varying types of design and construction. Watch for them.

10 COTTRELL ADVANTAGES

that make Cottrells unsurpassed for all types of recovery problems, hot or cold, wet or dry

1. **LOWEST DRAFT LOSS** — only a few tenths of an inch w. g.
2. **LOWEST POWER COST** — only ½ to 1 kwh. per 100,000 cu. ft. of gas cleaned.
3. **LOWEST MAINTENANCE COST** — all metal, few moving parts, no fire hazard.
4. **LOWEST LABOR COST** — operation can be fully automatic, if desired.
5. **LONGEST LIFE** — early Cottrell installations still operating after 39 years of continuous service.
6. **HIGHEST EFFICIENCY** — recovery efficiency approaches 100%, if desired.
7. **UNIVERSAL APPLICABILITY** — recover any suspension, solid or liquid — in any gas — over wide temperature ranges.
8. **ANY CAPACITY** — handle a few c.f.m. — or millions — with equal ease.
9. **MAXIMUM FLEXIBILITY** — readily adaptable to varying installation requirements.
10. **LOWEST OVERALL COST** — cost less per year of service, less per ton recovered. Often pay for themselves in a few months — always within a few years.

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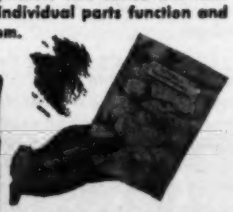

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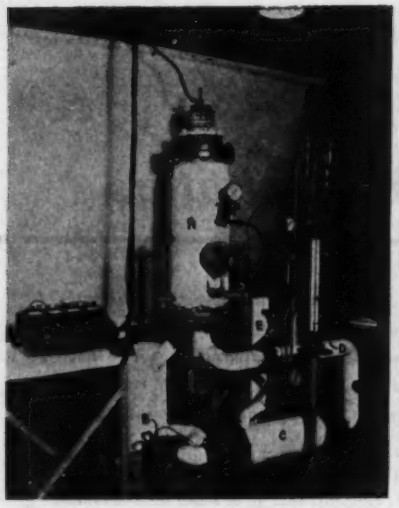

Fig. 2—Evaporator No. 1

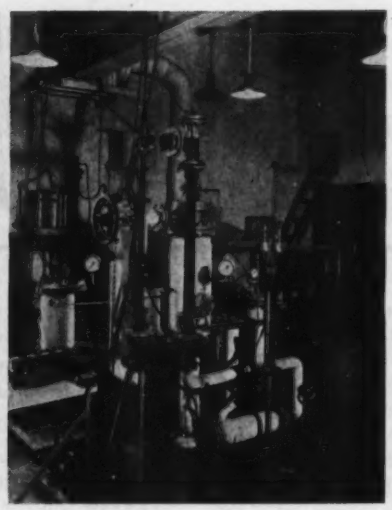

Fig. 4—Evaporator No. 2

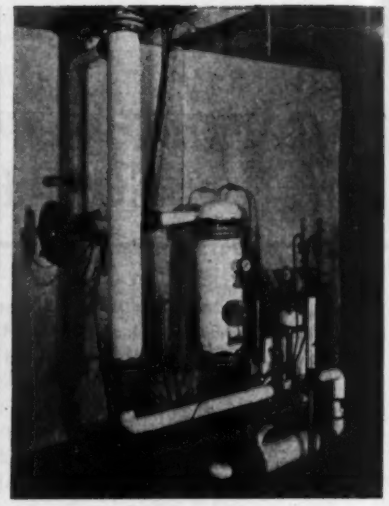

Fig. 6—Evaporator No. 3

liquor at the rate of about half a ton per day.

An extensive investigation of the many factors of process and equipment followed. The results served to strengthen our belief in the ultimate value of the electrical method of evaporation. They also brought out deficiencies in the apparatus. The decisive weakness was a lack of capacity to separate from the waste liquor the steam bubbles formed in it by the current. This occasionally resulted in foam levels which rose to the narrow gap between the high voltage electrode and the tank wall, resulting in heavy overload currents and melting of protective fuses, fortunately without doing other damage. Various changes made to better the steam separation gave only limited improvement. Furthermore, it seemed likely that this problem would become more acute in larger sized equipment of this design. It was therefore decided to build a new apparatus in which the heating and steam separating functions would be separated.

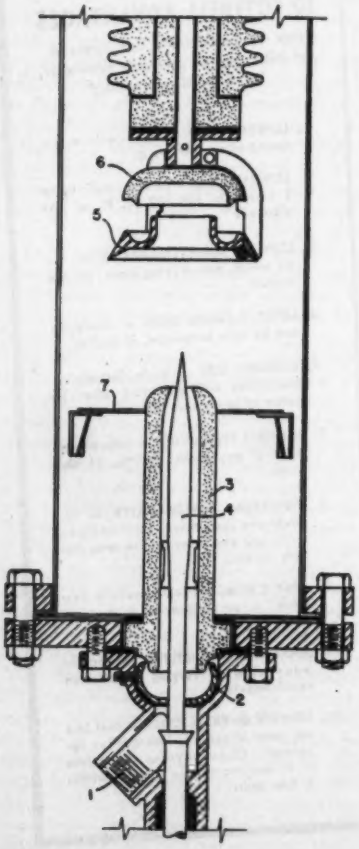

Fig. 3—Section through part of evaporator chamber, Evaporator No. 1

Evaporator No. 2

The high voltage electrode assembly and its insulating support were removed from the evaporator chamber of unit No. 1. In their place a steam separator was installed. The new electrical heater, in the form of an inverted U made of Pyrex glass pipe, was located alongside of the original equipment. The remodelled apparatus is shown in Figure 4. Liquor was pumped into the bottom of the right hand glass pipe through a perforated stainless steel plate which acted as one grounded electrode. The liquor then rose through the 3-in I.D. pipe to the 4-in tee at the top where it flowed past the high tension electrode which was supported on the rod visible above the liquor in the top arm of the tee. Liquor flow continued down the 1¼-in I.D. glass pipe to a second perforated grounded electrode below the 4 in reducer.

From there the solution flowed through a needle valve from which it discharged tangentially on to the inner surface of the steam separator in the original evaporator chamber. The residual liquor dropped to the bottom of the chamber for recirculation. As with evaporator No. 1, this unit was designed to operate with the circulating liquor at approximately the final concentration desired, and with steady addition of dilute feed and removal of concentrate. The heater construction of evaporator No. 2 was not intended as a commercial prototype due to pressure limitations. However, the Pyrex pipe was readily available and permitted extensive trials of the new design at pressures up to 65 psi in the glass sections. For safety during operation of the unit, the glass pipes were enclosed in a shielding box with plastic observation windows.

Evaporator No. 2 was subjected to extensive tests using voltages from 1100 to 2200 and power inputs up to 75 kw, or evapora-

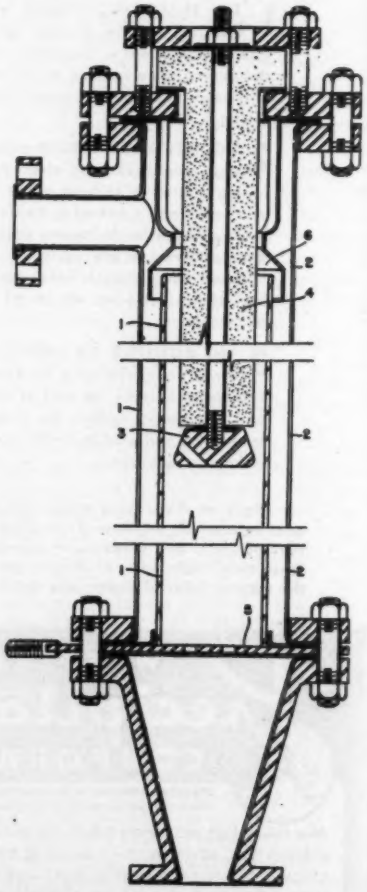

Fig. 5—Section through electrical heater chamber, Evaporator No. 3

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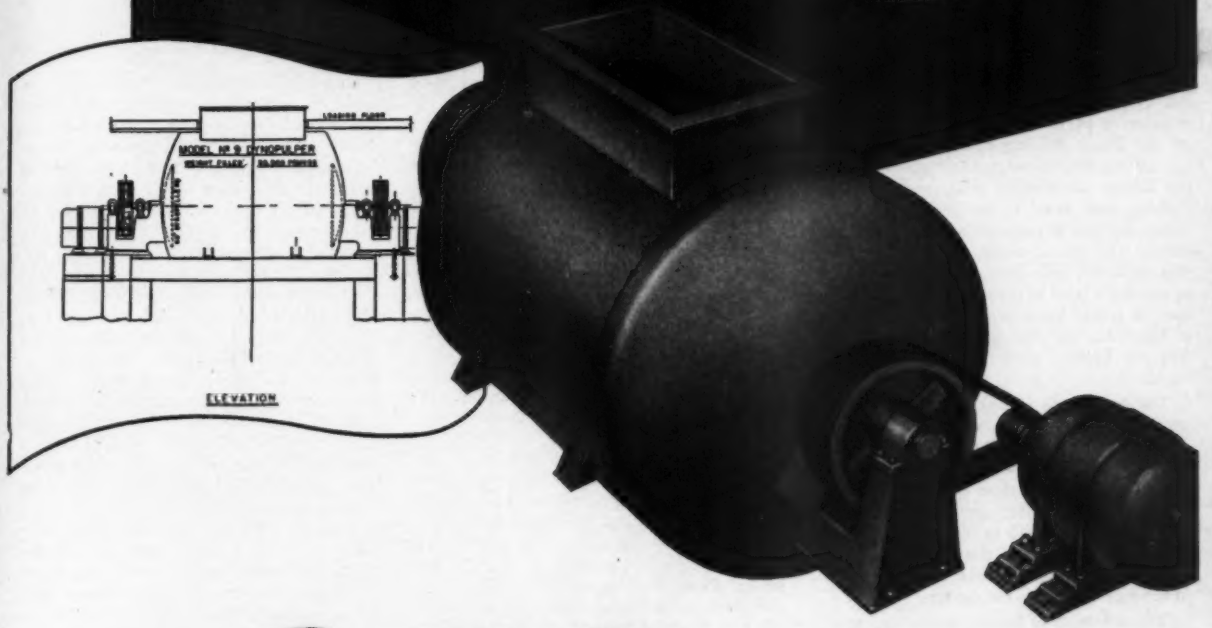

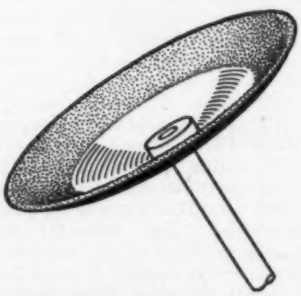

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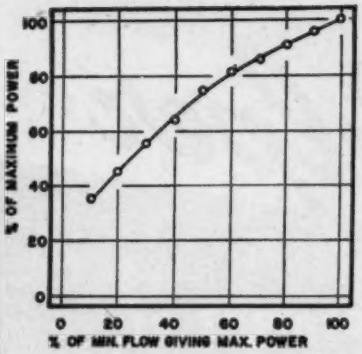

Fig. 7—Variation of power imput with rate of liquor circulation

tive rates up to 2¼ tons of water per day. Working pressures were held to a maximum of 65 psi, because of the glass pipe.

There were two modes of operation for this evaporator. In the first, sufficient back pressure to prevent boiling was maintained on the liquor flowing through the heater; i.e., all the heat generated was absorbed by the liquor as sensible heat, subsequently flashing into steam as the pressure on the liquor dropped in passing through the needle valve. The second mode of operation was that in which back pressure and flow were at too low a level to permit complete absorption of power input as sensible heat. Part of the steam was then formed in the heater, and the balance after passing the needle valve.

The first mode of operation gave maximum power input for any given voltage, liquor concentration, and operating temperature. Power input was very steady. The second type of operation provided a ready means for power input control with smooth operation down to 40 or 50 per cent of the maximum power; i.e., down to about half of the power which would be drawn with steam-free liquor in the heater.

The provision of specific means for steam separation greatly reduced foaming in this evaporator as compared to evaporator No. 1. However, foaming and priming occasionally occurred under either of two conditions. These were:

1. On starting the evaporator when the steam chamber contained air. Tenacious foam formed at temperatures from 95 to 105 C, persisting until the air was swept out. This type of foam could be avoided by purging the air with steam before start-up, or by adding about ten parts per million of Dow-Corning Antifoam A to the liquor charge.

2. On any sudden drop in the pressure on the waste liquor in the steam separating chamber. This caused steam evolution in the liquor in the chamber, forming bubbles which were slow to break.

Work with both the first and second evaporators gave indications of a measure of thermal breakdown of the waste sulphite liquor. Since the rate of decomposition increased with increasing evaporator pressures, it was deemed advisable to build a third evaporator capable of operating at pressures at least as high as were planned for the commercial application of the process, in order to properly assess the significance of the thermal breakdown. We also wanted to have a heater design which, on scaling up in size, would be suitable for industrial use. Accordingly, in association with Mr. H. O. Goddard of Foster Wheeler Limited, a new heating unit was designed which was built by Foster Wheeler to replace the Pyrex glass heater. The rest of the evaporator was kept substantially unchanged.

Evaporator No. 3

The construction of the new heater is shown in Figure 5. The electrical current paths through the waste liquor are completely confined within the single length of 4 in I.D. Pyrex pipe, 1. Passages are provided at both ends of the glass tube by which the waste liquor flowing through the heater has access to the space between the glass pipe and the stainless steel pressure shell 2, thus keeping equal the hydraulic pressures inside and outside the glass tube. The high voltage electrode 3 is supported near the center of the length of the glass pipe on an insulating structure 4 passing through the top flange of the steel shell. The perforated plate 5, which supports the glass pipe, also serves as the grounded electrode on the liquor inlet side. A second grounded electrode 6 is provided around the upper end of the glass pipe. This construction effectively confines the current paths through the waste liquor to the inside of the glass pipe. Figure 6 is a photograph of evaporator No. 3.

General Operation

In this new heater the spacing between the electrodes was much less than in Evaporator No. 2. It was therefore necessary to operate at lower voltages to prevent overloading our supply transformer. Investigations with this heater were made using 700 to 1100 v, at power input rates up to 65 kw. The new heater was found very satisfactory and operated well over the range of pressure tested, up to 150 psi. Very steady operation was obtained at flow and back pressure combinations in which no boiling occurred in the heater. Power input control with satisfactory operating conditions was available from 100 per cent down to about 50 per cent of maximum power through control of the rate of liquor circulation and the back pressure. Foaming and priming gave less trouble than before due to an improved construction of the steam separator.

On completing our experimental work with this evaporator, we were entirely satisfied that we had, in this design, a unit which could be scaled-up to give an economical and practicable industrial evaporator.

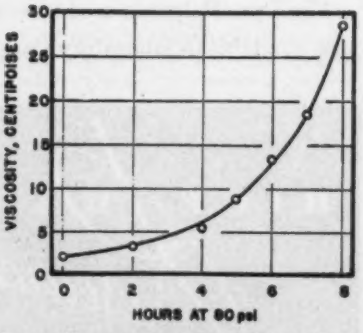

Fig. 8—Viscosity of concentrated waste liquor vs. time of heating at 320 Fahr.

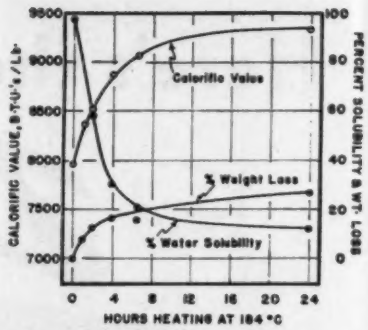

Fig. 9—Effect of time of heating concentrated waste liquor at 184 C (364 Fahr.) on: weight of solids in sample; heat value of solids; hot water solubility of solids; and total heat content of sample

Power Input Control

The power input control previously referred to was obtained by regulating the rate of circulation of the liquor through the heater, or the back pressure on the liquor therein, in such a way that steam bubbles formed in the liquor carrying current between the electrodes. Since the volume of space between the electrodes was fixed, the presence of non-conducting steam in the liquor in this limited space necessarily displaced part of the conducting waste liquor. This increased the electrical resistance between the electrodes and, the voltage being constant, reduced the current and the power consumption. Thus, by simply regulating the rate of liquor circulation through the heater, or the back pressure on the heater, the power input could be adjusted as desired over a considerable range, as a result of the occurrence of a controlled degree of boiling in the intra-electrode space.

A number of interesting observations were made in connection with the use of this method of power input control. We found that there is always a definite lower limit to the practical range of control which can be had in this way. This lower limit is marked by the occurrence of small electrical arcs through the steam-liquor mixture against the face of an electrode, usually the high voltage one. A moderate amount of such arcing resulted in the formation of spots of carbonized waste liquor on the face of the electrode and these spots, which carried current, became hot enough to dry and carbonize further waste liquor, even in the absence of any further arcing. Since the carbon could grow to almost fill the free space in the heater, it was essential to avoid conditions causing the arcing which started its growth.

Our work convinced us that the factor of major importance in determining whether such arcing would occur was the voltage gradient close to the face of the electrode. The first steam bubbles to appear, as flow is reduced to control power, were formed against the upper electrode. Since they are non-conducting they increased the resistance, voltage gradient, and power input at this point. With diminishing flow, a cumulative process thus resulted in which a higher and higher proportion of a diminishing total of power was consumed in a small volume against the upstream electrode. The previously uniform voltage gradient between the

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electrodes, which in our apparatus was about 11 v per cm, might reach extremes of over 200 against the electrode, dropping rapidly to less than 10 a short distance from the electrode. In our experience arcing was likely to occur when voltage gradients were greater than 150 v per cm. Current density on the electrodes seemed to be a factor of secondary importance. At reasonable voltage gradients current densities of 10 amperes psi caused no difficulties. Arcing occurred only at the lower current densities associated with much reduced power input and high voltage gradients.

The degree of power input control which may be had without arcing by controlled boiling in any heater will depend upon the operating voltage and upon the dimensions of the unit. When these factors are known, maximum voltage gradients may be calculated for various degrees of power regulation to foretell the safe range of control. We expect that 50 per cent regulation may be had at any desirable maximum power capacity, up to or over 5,000 kw per phase, for voltages up to 13,200 in heaters of reasonable proportions. Figure 7 shows the way in which power input varies with the rate of liquor circulation at constant back pressure.

Waste Liquor Decomposition in Evaporator

Early in our work at higher evaporation temperatures we found evidence of a thermal instability in the waste sulphite liquor. This was indicated by: the presence of carbon dioxide in the steam from the evaporator; increased viscosity of the liquor at a given temperature and concentration; change in Btu content of the waste liquor solids; and change of water solubility of the waste liquor solids.

The steam from our evaporators was found to contain carbon dioxide in amount increasing with increasing temperature of evaporation. At an evaporator pressure of 25 psi almost none was produced, while at 150 psi about 7000 ml, or roughly 12 grams, per minute of carbon dioxide were evolved. Since the rate at which waste liquor solids was being fed to the evaporator was about 120 grams per minute, approximately 10 per cent of the solids were, at 150 psi pressure, appearing as carbon dioxide in the steam. The rate of carbon dioxide production was found to be roughly proportional, at a given temperature, to the solids content of the circulating liquor, and to decrease as a given batch of liquor was held at high temperature for increasing time.

Paralleling the evolution of carbon dioxide was a marked change in viscosity of the concentrated waste sulphite liquor. Fifty per cent solids waste liquor prepared by evaporation below 25 psi pressure has a consistency at room temperature approximating that of corn syrup. Liquor of the same solids content after several hours heating at 125 psi would, at room temperature, be a rubbery solid, firm enough to be crumbled like moist bread. As an example of the viscosity change, a charge of 50 per cent solids waste liquor was prepared in our evaporator at 25 psi pressure (267 Fahr.). The pressure was then increased to 80 psi (324 Fahr.) and the viscosity of the circulating liquor measured at intervals. The results are shown in Figure 8. The liquor represented by the last point on the curve was a near-solid at room temperature.

This increase in viscosity with time and temperature is an important factor in evaporator design. Not only does circulation become more difficult during operation, but cooling of a viscous charge during a shutdown may convert it into a solid mass which must be scraped out before evaporation can be resumed. It is therefore necessary to design waste liquor evaporators for high pressure operation in such a way that the average dwell time of the liquor in the evaporator is short enough, relative to the operating temperature, to avoid a troublesome degree of viscosity increase. It is quite feasible to do so.

The thermal breakdown of waste liquor at high temperature in the evaporator resulted in an increase in heat value per pound of dry solids in the residue as compared to the dry solids of the unheated liquor. At the same time there was a reduction in total weight so that the total heat content of a given lot of liquor decreased with increased time of heating. The variation of these factors with time of heating in an autoclave at 184 C is shown in Figure 9. The material used for these tests was waste sulphite liquor concentrated to 50 per cent solids at atmospheric pressure. The heat values and weight loss figures are based on oven dried solids. The curve for total heat loss shows the composite result of the increase in heat content per pound of the residue and of the loss in weight. This heat "loss," when it occurs during evaporation, is only nominal since the heat released must be used for evaporation and will be at least as valuable as if it had been released by burning the waste liquor solids in a furnace. Figure 10 also shows the effect on solubility of autoclaving 50 per cent waste liquor. Solubility tests were made by oven drying the samples, grinding to minus 60 mesh, and leaching for one hour in boiling water. The decreasing solubility was paralleled by a decrease in the stickiness of the dried solids and an increase in their friability both very favorable trends from the viewpoint of storing and grinding the dried solids for use as a powdered fuel.

Pilot Plant Evaporator

The work outlined above convinced us of the feasibility of low cost electrical evaporation of waste sulphite liquor on a commercial scale. At our request, plans were prepared for us by Foster Wheeler Limited for a pilot plant installation for our Riverbend mill. An electrical evaporator designed on the principles of laboratory unit No. 3, but having a separate heater on each of the three phases, was to be used. This unit was designed to operate at 6600 v with a maximum power input of 5500 kw, producing about 35 tons per day (dry basis) of waste sulphite liquor at 50 to 58 per cent solids content. A spray dryer using boiler stack gas was planned for the final drying step. The evaporator was to operate at 80 psi, and the steam produced, which would contain some sulphur dioxide, was to be used as the heat source for an evaporator producing clean

(Turn to page 736)

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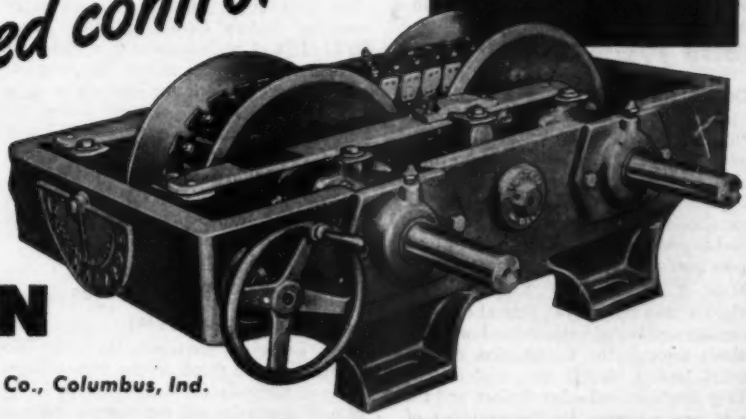

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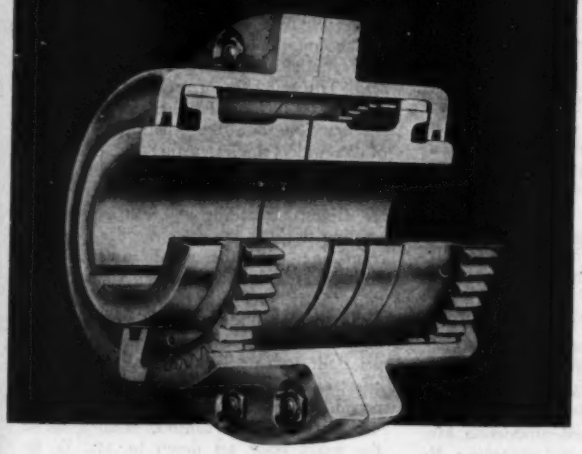

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ECA Plans to Modernize Potash Mills in France

For the purpose of increasing the production of potash by Mines Demaniales de Potasses d'Alsace (located in the region northwest of Mulhouse, France), the Economic Cooperation Administration has approved the expenditure of $4,000,000 in ECA assistance funds. This amounts to $1,000,000 in foreign exchange or the equivalent of $120,000,000 in francs.

The French reserves of potash are one of the principal sources of supply outside of Russia and the Russian zone of Germany. Mines Demaniales de Potasse d'Alsace is a public corporation operating 13 shafts and nine processing plants. The expansion and modernization project is expected to increase annual production from about 720,000 tons of pure potash in 1948 to 1,200,000 tons in 1957.

The recovery program in general calls for the modernization of underground working methods through the introduction of mechanical leaders, shuttle cars, coal cutters, drilling machines and other devices, and the use of new processes for the treatment of potash salts. Equipment for treatment by levigation and flotation will supplement the old thermal plants and eventually supersede them.

▼

Australian News

Australian Newsprint Position—It is believed that in line with dollar decisions at the London conference no licenses for the import of Canadian (including Newfoundland) newsprint will be granted for 1950, but that licenses already granted for the import of 35,000 tons from Canada this year and 5,000 tons in the first half of 1950 will not be cancelled by the government.

If further dollar cuts are to be made, and it is very likely that an announcement in this regard will soon be made, Australian individual ten-year newsprint contracts with Canada will necessarily have to be suspended.

Coal Strike Has Hit Publishers—The communist-inspired coal strike has ended after seven weeks duration with a complete victory by the Australian Government which did not give in to any of the miners' demands. Nevertheless, the strike has had a disastrous effect upon all Australian industry, particularly upon publishing interests and metropolitan dailies. All periodicals, printers, setting houses, and engravers were affected. Size of metropolitan newspapers was cut by 10 to 20 per cent, and advertising during the period of the strike dropped greatly.

From New Zealand—An order from England for 2½ million square feet of New Zealand hardboard and softboard manufacturers. Equal to a twelfth of the annual output of New Zealand's forestry concern, N. Z. Forest Products, Ltd., the shipment will give production a push that is needed as saturation point is reached on the home market.

Printing Inks—Sydney Cooke Ltd., printers furnishers, have entered into an agreement with the Interchemical Corporation of New York under which a new subsidiary company, Sydney Cooke (Printing Inks) Pty. Ltd., will be incorporated in Australia to manufacture under license the complete range of specialty printing inks produced in the U.S.A. by the corporation. Under the agreement, Interchemical Corporation will continuously make available complete formulae and technical information. In addition, the Australian subsidiary will have free access to the experience, knowledge, and research of the corporation's laboratories.

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British Paper Notes

(July, 1949)

▶▶▶ Immediate reaction to the recent fairly heavy cut in prices in the British paper trade is generally favourable, except in the case of newsprint and the cheaper qualities of boards.

Sir Eric Bowater, chairman of the Bowater Paper Corporation, referring to the new price for newsprint, pointed out that the lowered price would have no effect on the economy of the British newsprint mills. He disclosed that the new prices being charged by the Board of Trade to the mills for mechanical pulp was £21-10-0 ton and for sulphite pulp £36-0-0 ton, also that the prices negotiated by the Board of Trade with the Scandinavian countries for supplies for the third quarter of this year were £16-17-6 ton for mechanical and £25-10-0 for strong sulphite, delivered British ports. "On the face of it," he stated, "it would appear that the Board of Trade continues to make a very substantial profit on its pulp deals." He also expressed the opinion that the permitted basis of operation for British newsprint mills should have been increased far beyond the 55% at present authorized, especially as the necessary raw materials are now available for higher production.

Mr. H. C. Drayton, chairman of United Newspapers Limited, also stressed the excessive price being charged for newsprint. Despite the recent reduction this was £9 ton above the world market price.

On the subject of board production Mr. W. J. Smith (chairman and managing director of the Colthrop Paper and Board Mills, Limited) is outspoken on the subject of the continuance of the Paper Control. This company's profits dropped by £40,000 during their last financial year which ended in May. As the latter part of this year covered several months under a Paper Order which, by determining the proportions of materials to be used, added considerably to the costs of production without compensating selling prices, with the result that this mill, during the past six months, has been working at a loss, despite increased production. The chairman did "not see any possibility of the company making a reasonable profit until we are permitted to make a fair and reasonable charge for our manufactured board or until the Paper Control is terminated."

In connection with present day costs of production Mr. L. W. Farrow, chairman of Wiggins, Teape and Company (1919) Limited, in his statement at the annual general meeting, made the interesting disclosure that only five pence out of every £1 earned went to shareholders. The remainder was comprised of 12/6½ materials, 3/7½ wages, and the balance power, rent, taxation, and reserves.

This vast company has several important projects in hand. Apart from erecting two new stationery factories in South Africa, the buildings of which are nearly completed, and purchasing the bulk of the shares of A. Armstrong and Co., Ltd., Dublin (the largest manufacturers of envelopes and stationery in Eire), a new plant and machinery specially designed for making tracing paper is being installed at the Chartham mills belonging to this company. Their new mill at Wooburn Green, which will be devoted to the production of photographic base paper, is well advanced, and it is hoped that manufacture will start next year. Also the new mill in South Wales, to be devoted to the manufacture of tissue papers, is making progress. Here also it is anticipated that production will start in 1950.

The immediate situation in the British paper trade is certainly one to cause concern. The purchase of paper is limited to oddments which are required for immediate consumption, and the smallness of some of the orders indicates that the merchants are not willing to lay down stocks of any description beyond assured "bread and butter" lines. Unloading and consumption of existing stocks is the present order, and this coinciding with the usual summer slack period has reduced purchasing to a minimum. It is, however, hoped if not anticipated that in a few weeks time trade will be on the move again. Meanwhile recent price adjustments have not had the slightest effect and might just as well not have happened. A few days ago the coated qualities, which are outside control, were reduced, the wood body art down to 11d lb for export, the home price being 11⅜d.

That the position might tend slightly to revert in the near future is possible, consequent on the new monetary crisis, for Great Britain is once again suggesting the probability of a curtailment of the purchase of paper and pulp from Canada. Sir Stafford Cripps, Chancellor of the Exchequer, has suggested as much as a third reduction. At

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the same time it is suggested that increased purchases are to be made from the non-dollar areas.

A measure of the current position in the pulp producing countries is disclosed by the news that three sulphite factories belonging to Sundsvallsbolagen in Sweden are to close for one or two months, owing to the difficulty of selling pulp, especially to the U.S.A. Concurrently from Scandinavia comes news of a steep reduction in the prices of wrapping papers, in one instance to over £14 ton, and further news is that all classes of paper except newsprint are to be reduced by approximately 10%.

That Scandinavia is recuperating her losses of sales in other directions by increased deliveries to Great Britain is indicated by the Board of Trade returns covering the first half of the present year. Here it is seen that the comparative figures for the periods January-June, 1948 and 1949, for Finland are 150,394 and 172,840 tons, for Sweden 194,558 and 235,800 tons, and for Norway 62,770 and 121,421 tons. Total material imports reaching Britain this year so far are 868,337 tons which compares with 724,448 tons for 1948. Only rags are showing declines, for chemical pulp is up by over 69,000 tons and the mechanical quality by nearly 56,000 tons. Esparto grass imports have reached the record figure of 219,618 tons. Exports of paper and boards are up nearly 37,000 tons, but as newsprint accounts for 30,000 tons, the increases in the other qualities are not very great. Incidentally, the U.S.A. has taken over 16,500 tons more this year than last. Imports are down by over 12,000 tons.

Foreign Abstracts . . . . . .

Correlation of Some Mill and Laboratory Beaters

Assessments were made of the degree of correlation between the beating effects on bleached Eucalyptus (*E. regnans and E. obliqua*) kraft pulp of various laboratory beaters and two Walmsley twin-bedplate one ton hollanders and a Sutherland refiner. The laboratory beaters were the following: a Clark kollergang, a Lampén mill, a Valley Niagara 1½ lb beater, an old model of the Morden Stockmaker, and an Aylesford beater. The best correlation was obtained with the latter, while the Valley Niagara beater was almost as good. However, under test conditions none of the correlations could be termed more than fair to fairly good. The poorest ones were with the Lampén mill and the kollergang, and the better correlations were obtained with bar-type laboratory beaters. When newsgrade sulphite pulp was used, a fair correlation was obtained between the mill beaters and the Niagara laboratory beater. The kollergang gave a fairly good correlation but that from the Lampén mill was poor. Description and operating characteristics of all beaters are given in great detail. The data are given in several tables and in numerous graphs. Correlation curves give a convenient means for evaluating the relationships. The general conclusion is also reached that all physical properties should be taken into account simultaneously, when attempting to estimate the correlation between the beating action of the various pieces of equipment.

An individual comparison is shown in Table 1 (in which *Eucalyptus regnans* bleached kraft was used).

However, the original data (*in toto*) would have to be examined to give true weight to the correlation between mill and laboratory beaters. The pulps used were *A* (bleached Eucalyptus kraft, alone), *B* (bleached Eucalyptus kraft and a coniferous sulphite mixture), and *C* (a mixture of coniferous sulphite pulps). A. J. Laugher. *Proceedings of the Australian Pulp and Paper Industry Technical Association*. 2, 155-174 (December, 1948).

TABLE 2

Laboratory type	Mill type	Pulps used	Correlation
Kollergang	Hollander	A	Very poor
		B	Very poor
		C	Just fair
Lampén Mill	Hollander	A	Very poor
		B	Very poor
		C	Poor
Niagara	Hollander	A	Fair to good
		B	Fair
		C	Fair
Morden	Hollander	A	Just fair
Aylesford	Hollander	A	Fairly good
Kollergang	Sutherland refiner	B	Very poor
		C	Very poor
Lampén Mill	Sutherland refiner	B	Poor
		C	Very poor
Niagara	Sutherland refiner	B	Poor
		C	Fair

Performance of the Lampén Mill in Australia

The results of a systematic study of the variables in using a ten kg. Lampén mill are discussed at length. Mill variables that are critical are: speed, microscopic condition of the beating surfaces, and the slip occurring between the free-rolling ball and the mechanically revolving shell. The pulp variables which are critical are: pulp charge, stock concentration and temperature.

The author gives a brief historical review, and describes the essential design and beating action of the mill and its standard dimensions. For unbleached Eucalyptus kraft pulps, the optimum stock concentrations lie between 3.3 and 3.6%. For "long fibered" pulps (which included Ljusnan kraft, a K-Crown-B sulphite and a St. Regis kraft) the best stock concentrations are between 2.7 and 3.0%, whereas for *bleached* Eucalyptus pulps the concentrations best suited to the Lampén mill are between 3.6 and 3.9%. For precise work (where the maximum beating effect is of paramount importance) the author recommends that for both bleached and unbleached Eucalyptus pulps the stock density be kept at 3.6%. A certain amount of frictional heat is developed in the mill, and the mean beating temperature should be kept at 25 degrees (with a permitted range of 23-27 deg. C.). Whereas with Eucalyptus pulps, and with sulphite stock the beating surfaces of the Lampén mill retain (or gain) a high polish, this is not true for long fibered kraft pulps. These give rise to surfaces dulled and mottled by minute bruises. However a smooth surface can be regained quickly by intermediate beating with Eucalyptus pulps.

Indiscriminate use of a single mill for evaluating all types of pulp should be avoided. Disagreements in the results obtained with different Lampén mills may depend in part on differences in the condition of the beating surface. A safe remedy is to designate different mills for evaluating pulps "which polish the surface" and those which dull them. A safer division (and one adopted in Australia) is that of differentiating between mills used for beating hardwood pulps and those used in beating softwood pulps. The Australian standard conditions for Lampén mill operation (besides those given above) are: 250 (± 3) rpm, 24 g. (± 0.5 g.) pulp charge (on the oven-dried basis); total stock charge for long fibered pulps 889 g., for all Eucalyptus pulps 667 g. The choice of beating periods remains optional, but it is emphasized that a short period of 1,125 revolutions for a 24 g. pulp charge is desirable and that the chosen periods should preferably be in geometric progression.

The advantages of a Lampén mill as a laboratory beater, under Australian conditions, are fully described, and some of the disadvantages are also outlined. Among the latter may be mentioned the fact that it is essentially a batch beater and that several consecutive beatings are required to establish an evaluation curve (whereas in other laboratory beaters these beatings are concurrent). Another disadvantage is the dominance of internal fibrillation, and the accompanying rapid development of bursting strength at the expense of tear. Suggestions for overcoming this disadvantage are discussed. It is obvious that the Lampén mill is

TABLE 1

Beater used	C. S. Freeness 250			C. S. Freeness 400		
	Burst factor	Tear factor	Bulk	Burst factor	Tear factor	Bulk
Commercial Hollander	38.5	62.5	1.52	31.5	62	1.61
Aylesford	45	65	1.20	37	65	1.32
Niagara	41	55	1.47	35	61	1.61
Kollergang	29.5	40	1.42	28	48	1.54
Lampén mill	34	57	1.39	29	61	1.51
Morden	35	63	—	27	66	—

Comparison of Lampén Mills "A" and "B" Using Eucalyptus Kraft Pulp

Beating Period in Revolutions	Mill	C.S. freeness	Bulk	Burst factor	Tear factor	Breaking Length—(kilometers)	Per cent Stretch
15,000	A	245	1.40	65.5	100	9.3	3.7
	B	245	1.39	65.5	103	9.4	3.7
22,500	A	160	1.35	67.8	98	9.8	3.9
	B	148	1.33	67.8	98	10.2	4.0

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very satisfactory for the laboratory beating of Eucalyptus pulps, whereas the ability of other beaters (with barred tackle) to handle such pulps effectively and still remain in good working condition remains to be demonstrated.

In an extensive appendix the author describes the correlation between laboratory beaters and mill beaters. In one series of runs the functioning of a research laboratory mill was compared with that of two Lampén mills used in commercial practice, one badly pitted and "scoured" and the other one in rather good condition (excepting for a slightly deformed ball). Using Eucalyptus pulp the correlations between the three mills were good. However one of the commercial mills had been made locally (and was a composite mill) and this one was the least successful one of the three. Another interesting comparison was made with two Lampén mills (one of Finnish and one of Swedish manufacture). These also yielded beaten pulps the properties of which showed very good agreement, even though the inner surfaces of one of the mills had been scratched. This is indicated in the table (see p. 732), *mill A* being the one which had been "scoured."

One of these Lampén mills was then compared with a Clark kollergang. Here for a given degree of beating, the differences were highly significant in the cases of tear, burst, and bulk. During the later stages of beating at a given bulk value, the Lampén mill developed a greater bursting strength than did the kollergang. The regression of bulk in the log of the beating period was linear in either case. The instruments did not differ markedly in precision; the kollergang could efficiently handle pulp charges up to at least 80 grams. The kollergang mentioned above was compared with another kollergang, and the average differences between these were significant in the case of freeness, burst and tear resistance. (In the case of these experiments distilled water was used.)

Among the factors affecting beater correlations, that of water was significant. For example, in a study of Lampén mill variables, it was shown that *unbeaten* eucalypt kraft registered a C.S. freeness of 380. However, this same pulp at the kraft mill of Maryvale (Victoria) had a freeness of 500. These differences could be ascribed largely to the variations in water. A carefully washed Eucalyptus pulp (ash content 0.16%) was treated with increasing amounts of various salts and then tested (for freeness) in each case. It was shown that the highest Canadian Standard Freeness was developed by Al^{+++} and Fe^{+++} ions, then came H^+ ion, followed closely by Mg^{++} and Ca^{++} ions, and finally sodium ions. The lowest freeness was noted when cations were absent (*i.e.* when distilled water was used). When the various anions were arranged in a corresponding series, these fell in the order of alkalinity of their solutions; i.e. [Cl^- and SO^{4--}] was greater than when anions were absent; whereas distilled water had more effect on freeness than did HCO_3^- or PO_4^{---} which in turn were more effective than were carbonates. The effects of other (less common) cations are also discussed. Tensile and bursting strengths were also sensitive to salt effects, whereas bulk and tear were largely unaffected. Beaten pulps are more sensitive to salt effects than are unbeaten pulps. Water-washed pulp is more sensitive than is acid washed stock. Interestingly enough, the strength properties are affected by cations in the following descending order (Na^+ or K^+) > (Mg^{++}, Ca^{++} or no cation) > (Zn^{++}, Fe^{++}) > H^+ > (Ce^{+++}, Fe^{+++}, Al^{+++}) > Th^{++++}. Often these effects are noticed with salt concentrations not exceeding 50 ppm, hence in any comparative studies on effects of beating, the salts in the water must be taken into consideration.

A correlation in the performance of beaters which differ in design and beating action is difficult. For example, a pulp processed in a Lampén mill has a greater strength development and much higher freeness than has the same pulp when beaten in a Valley beater. Similar differences arose between laboratory and mill beaters. W. E. Cohen. *Proceedings of the Australian Pulp and Paper Industry Technical Assn.* 2, 84-131 (Dec., 1948).

Technical Lignin and Its Derivatives

A review is given of some of the work of the Research Institute of the Rauma-Raahe Oy (maintained by various Finnish woodworking and pulp industries). It describes researches over a four-year period. Various attempts were made to precipitate lignin from spent waste liquors with chlorine but due to difficulties in filtration, these were

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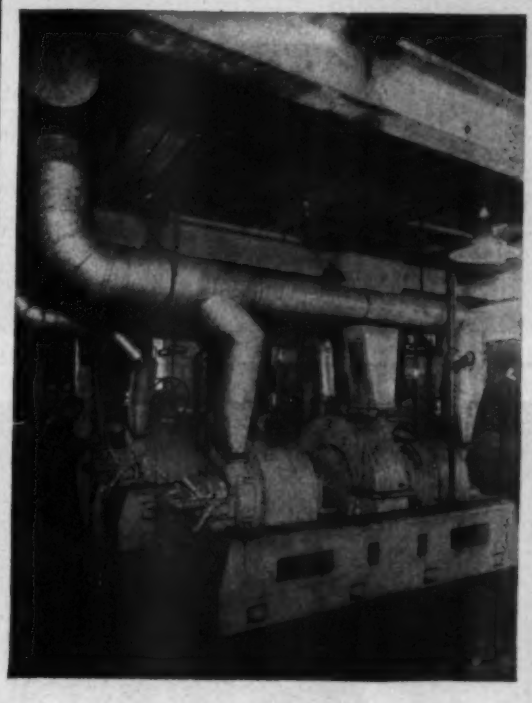

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- Sulphite knotter and screen rejects for newsprint, boards, and specialties.
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finally abandoned. Finally, the method originally proposed by Streeb (*Dissertation* Göttinger 1892, p. 21) was used.

This consists of isolating the lignosulphonic acid from a fermented sulphite waste liquor, first by neutralizing with lime, filtering, adding additional lime (20-35 grams per litter) and then by raising the temperature to 140-170 C. At lower temperatures the precipitate is slimy and difficult to wash, but after heating to 140-170 deg. (but not as high as 200 deg.) the precipitate is easily filtered. This lignin is termed "Streeb-Calignin." When this lignin is treated with aqueous hydrochloric acid, sulphur dioxide (7-8%) is evolved and the so-called "Rauma lignin" (I) (which is much lower in ash) is formed. *I* represents 44.5-49.6% of the Streeb-lignin and usually contains only 0.5 to 2% ash (on the dry basis). *I*, when nitrated, gave up to 22.5% oxalic acid. *I* could also be chlorinated with evolution of HCl. A patented process involves the treatment of *I* with furfural but the product is not described. By treating *I* with alcohol and a base, such as lime or sodium hydroxide, see Suida and Prey, *Ber.* 75, No. 12 1580 (1943).

At higher temperatures and pressures, the author obtained degradation products from which a *phenolic material* (II) was isolated. *II* is crystalline, has the probable formula $C_{16}H_{14}O_3$ melts at 128 deg. and gives an acetyl derivative melting at 73.8-75.7 C, but gave *no* methyl ether. On oxidation with chromic acid, it gave a yellow quinone, $C_{16}H_{12}O_2$ melting at 111-12 C possibly "duroquinone." II is being subjected to further study. 17 References. Ragnar Monnberg, *Finnish Paper Timber J.* 31, No. 7a, 11-18 (1949). [Special issue; in English]

Examination of Crude Sulphate Turpentines

The author has chosen at random five crude sulphate turpentines and has subjected them to intensive study. His data include color (which was invariably yellow), odor (which always was unpleasant, due to mercaptans), acid numbers (which ranged from 0.2 to 1.2), ester numbers (ranging from 0 to 1.8), density at 15 C (ranging from 0.8680 to 0.8725); flash points (28-49 C); "mean boiling points" (I) (ranging from 158.5-162 deg.); the so-called boiling point numbers" (II) (varying from 161.3-169.3 deg.), and a complete series of fractionations (given in volume per cent of the orignal turpentine).

I was taken in a simple apparatus devised and fully described and illustrated by the author (and manufactured by Fritz Kuhn, Schleusingen, Germany).

II were obtained in each case by determining the sum of the *upper boiling points* of each of ten fractions between 5 volume per cent and 95 volume per cent of the oil, and dividing this sum by 10. By mixing petroleum ether with a sulphate turpentine in various proportions ranging from 1:1 to 1:3 (so that the mean boiling points ranged from 82-102 C) excellent motor-vehicle fuels were obtained.

Diesel engines can also be run on mixtures of fuel oil and crude sulphate turpentines. Despite the orignal repellent odor of sulphate turpentine, cuts taken above 160 C are usually free from mercaptans, and 48-82.5% of the turps can be purified in this way (by discarding the initial lower boiling fractions). However the crude oil (both in its volatility and odor) is definitely inferior to gum turpentine. Five tables and 1 cut are given. August Noll. *Wochenblatt für Papierfabrikation* 77, No. 5, 131-133 (1949) (In German).

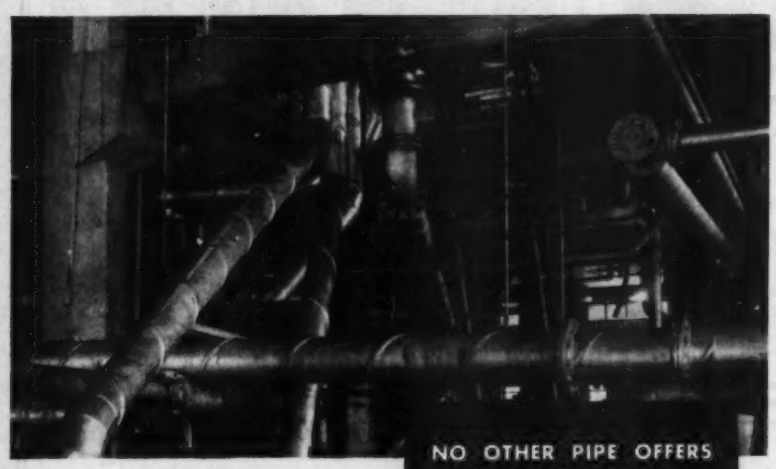
▼

Electrical Evaporation . . .

(Continued from page 728)

steam at 35 psi for use in the paper machine dryers.

Estimates indicated an excellent return on investment if secondary electrical power were available, and a more modest, but still worthwhile, profit using primary power. However, about the time we reached this stage of planning, another development made it probable that we would ultimately be producing pulp at higher yields, possibly up to the 65 per cent range. Cooking at such a yield would greatly reduce the solids content of the evaporator feed liquor and reduce in proportion the return expected from the installation. This situation, plus the recent shortage of secondary power, made it advisable to defer construction at least until results were known on the high yield project.



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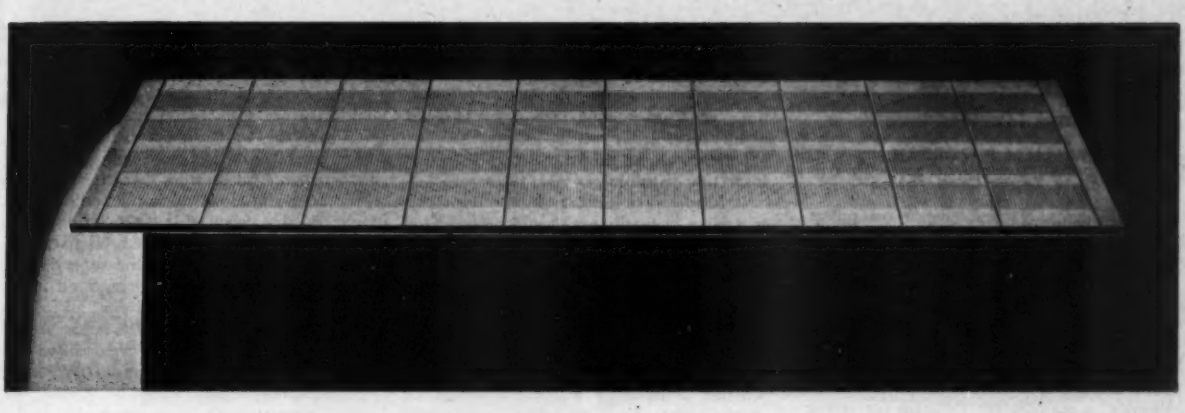

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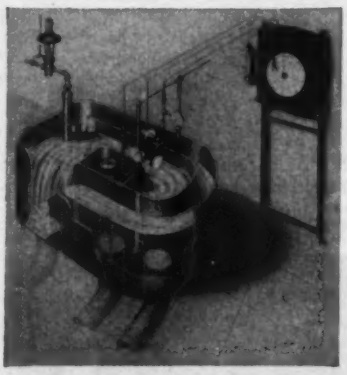

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Power Plant Maintenance*

WILLIAM P. JORDAN

Ecusta Paper Corporation

Large items of maintenance on power generating equipment in the majority of mills must be scheduled to conform with the demands of the production department, and as a result of this, it is necessary that a maintenance schedule for power plant equipment must be established and strictly adherred to, more than in any other department in a paper mill. Actually, in my opinion, a maintenance program for power plants is very similar in most instances to a preventive maintenance program in any other department in a paper mill, with the exception that opportunities for complete overhaul are limited. As a result of this, it is necessary that all equipment in our power plants must be kept operating as efficiently and kept in as good a condition as possible in periods between scheduled shutdowns.

The backbone of a preventive maintenance system is actual information compiled on the performance and condition of equipment.

In order to compile such information, it is necessary that strict inspection schedules of every piece of equipment in our power plants be established. Setting up an inspection schedule for maintenance purposes, in my opinion, must first be started by setting up a record of all equipment which is within the power plant. This would be an inventory of all operating machinery and its necessary auxiliary equipment which would be as complete an inventory as carried by the Accounting Department. This equipment inventory would list the name and type of machine, its function, the manufacturer, serial number, and other pertinent data that will clearly identify every piece of equipment and its component parts that you intend to maintain or cover in periodic maintenance repairs. From this equipment inventory, can be made a record, preferably a card record, on which over a period of time, you can accumulate maintenance and repair data, from which information and experience can be gained to set up a definite inspection schedule.

It is not possible to say how often a certain piece of machinery should be inspected or checked without some knowledge of what its past performance has been.

In the beginning machinery cannot be inspected too often, and if the proper records are kept on the equipment inventory of all repairs and replacements, a schedule can soon be arrived at which will tell us whether a piece of machinery should be checked once per shift, once per day, or over a greater period of time, sometimes lasting for a year or more.

The person in charge of operating the power plant, after determining from his records of inspection periods for various pieces of equipment should then work out a regular inspection chart, or have an inspection schedule become a part of the daily operating log, with the piece of equipment which requires frequent inspection listed on this inspection chart or daily log sheet.

In the majority of power plants, it is not economically feasible to have a crew of men, or a man even, for the specific purpose of devoting his full time to inspecting and maintaining the power plant equipment, and also recording on the proper form the results of such an inspection.

As a result of this, it usually falls upon the power plant supervisor or manager and the operators and workers within the power department to maintain an inspection record of the equipment.

It should then be the duty of the operator to make a complete inspection of the items indicated by the chart, and make an indication on the chart that the equipment is operating satisfactorily, or if it is not, make whatever comments are necessary and report these to his supervisor immediately.

If this is done, the manager of the power plant will know that the equipment is operating satisfactorily, and efficiently, at all times, or he will know when any needed adjustments or repairs are needed which can then be done by the regular mill maintenance crew or deferred to a later date.

From the daily inspection chart or log sheet, the supervisor of the power plant can make up a memorandum of detailed maintenance work which is necessary to be done in order to keep the plant operating at maximum efficiency. From this detailed maintenance memorandum, he will be able to have the work done which is necessary immediately, or he can compile a list of the maintenance work which can only necessarily be done during a periodic complete shutdown on power generating equipment. If such a record is kept up-to-date, and followed religiously, the supervisor of the power plant can at all times tell immediately exactly what condition all of his equipment is in, and what needs repairs and whether it has been repaired or not.

Another important phase of preventive maintenance which cannot be stressed too highly, particularly in power plants, is that of seeing that all of the equipment is properly lubricated, and that the lubricants at all times conform to required specifications for their particular applications.

This is one phase of preventive maintenance that must of a necessity be carried on by a workman specifically assigned to this duty. He must be held fully responsible for the proper execution of these duties.

These duties should not only include the application of the proper lubricant at the proper time, but also the keeping of a regular lubricating chart which will show where a particular piece of equipment requires lubricating, and that it has been lubricated.

It is of extreme importance that regular schedules shall be set up for testing and checking the condition of the oil in turbine lubrication systems, and also in checking the oil pump and filtering systems with which all of our modern turbines are equipped.

Modern and up-to-date power equipment is designed now to give many years of trouble free operation with a minimum amount of repair and maintenance work.

That modern equipment will operate in this manner will also be proven from our daily or periodic inspection charts. However, even though the equipment seems to be in good operating condition and running satisfactorily, it would not be wise to continuously operate this equipment without at some specified interval looking on the inside of the equipment so that we know exactly what its condition is.

As an example, we believe that in spite of what our inspection chart shows, that our turbines should not be allowed to operate for more than a two year period of

(*) Abridged from an address given before the Mill Maintenance Group at the annual convention of The American Pulp and Paper Mill Superintendents Association held in Atlantic City, New Jersey, June 15-17, 1949.

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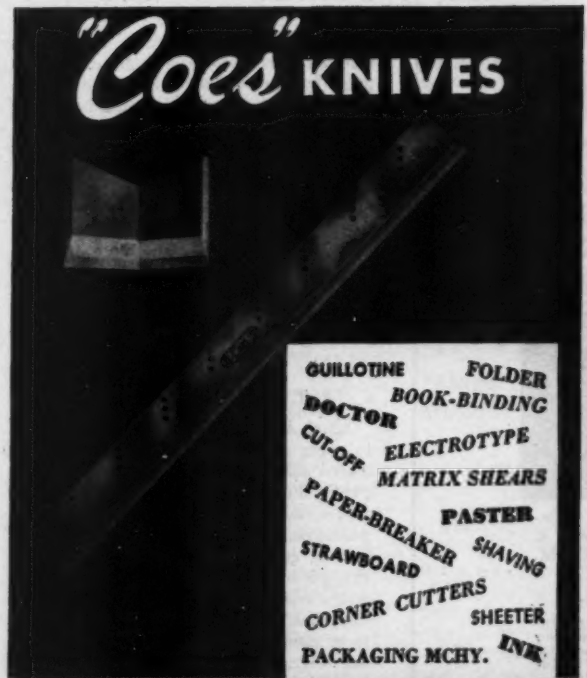

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- Alpha* Protein solution is stable over a wide temperature range.
- Alpha* Protein is compatible with the various pigments used and binds them to the fiber of the raw stock easily.
- Alpha* Protein adhesive has a color which does not affect, to any extent, the colors of the pigments used or their hiding power.
- Alpha* Protein alkaline-cut adhesive permits addition of formaldehyde to coating colors to make the finished paper water resistant.
- Alpha* Protein adhesive is free-flowing at a low water ratio.
- Alpha* Protein adhesive keeps pigments or other insolubles more uniformly suspended—prevents formation of hard, difficult-to-disperse masses.
- Alpha* Protein adhesive sets quite rapidly and dries easily without undue shrinkage or interference with the finish when the paper is calendered.

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time without it being completely dismantled.

In order to open up equipment, a definite schedule must be worked out for a periodic shutdown of the power plant which, of course, would have to be tied in with the demands of the production department.

This periodic shutdown should be strictly adherred to, and should have the complete support of the mill management, for only in this way can management be assured of obtaining the maximum life span of any piece of equipment. At such times as large pieces of equipment, such as the turbines and boilers, are dismantled, they should be inspected not only by our own maintenance employees and supervisors, but also by representatives of the manufacturer, and such other consultants as may be retained by your particular company for advice in the proper operation of your power plant. To properly carry out a scheduled shutdown of the power plant equipment, as mentioned above, and so that this scheduled shutdown will be of as short duration as possible, it will, of course, be necessary for the supervisor of the power plant to compile from his inspection records a definite list of maintenance work scheduled for this shutdown.

Also, he should have compiled, in addition, the various other items of preventive maintenance which should be performed at this time, such as cleaning interiors of the turbines and boilers and checking those various items which are unable to be seen while the power plant is in operation.

Both turbines and boilers should be inspected at frequent intervals until you are positive that the feedwater treatment and control is adequate to permit long periods of operation without shutdowns.

I have mentioned the treatment of water for it plays a most important part in increasing life and maintaining efficiency in the power plant.

In most of our modern power plants today, there is a multiplicity of meters and instruments that tell us whether our power plant equipment is operating at its maximum efficiency. Needless to say, it is absolutely necessary that these instruments also be maintained in first class condition at all times, or their value to a power plant becomes completely negligible.

It is our belief that the operation and maintenance of these particular instruments is of such a specialized nature that it, just as much as the lubrication, should be under the responsibility of persons other than operators in the power plant.

In our own plant, we have a regularly assigned meter department crew, whose responsibility it is to see that the meters are maintained properly. The men who are in this department, and who have the responsibility of maintaining these particular items of equipment, have been thoroughly trained in their work, even to the extent of attending training schools that are sponsored by the various instrument companies.

In addition to actually maintaining the meters, it is also the responsibility of the Meter Department to keep an equipment record, inspection schedule, just as much as in the Power Department itself.

I have mentioned before that we should have an equipment inventory on all machinery and equipment in our power plants, and that this record should have on it the history of any repairs or replacements made on any specific piece of machinery. If this particular record is properly kept, you will have complete information showing what parts were necessary to be repaired or replaced, the length of service, or life which was obtained from the part of equipment which was replaced or repaired. From this record, you can readily determine your spare parts storage.

Certainly all maintenance work in power plants could be speeded up considerably if our storage of spare parts were kept up to an absolute maximum, but in many cases. this is not economically feasible. It is not possible to apply a definite rule to any one plant, as to how many spare parts one should carry, but from the equipment record, showing the downtime and repairs necessary on the equipment, one can determine what minimum spare parts should be carried in order to minimize any downtime due to breakage.

As I have said before, the stock of spare parts which one should carry in all cases should be based upon past records. We all know that spare parts of any nature are only a form of insurance against loss of production, and a wise management will certainly not pay an excessive rate for insurance, and so in all cases, spare parts should always be based upon the statistics we have kept on the operation and performance of the particular machine.

A record should be maintained by the power plant management as to just what spare parts are carried for his department, and this record should be kept up to date.

Most equipment manufacturers will recommend items that should be carried, but their recommendations must always be tempered by other factors, such as the location of your mill, and as a result the immediate availability of repair parts.

Over a period of time, your equipment record, along with your spare parts record, will show what is the most economical number of parts to carry in storage.

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Enzyme-Starch Conversions and Their Application to Machine Coating Colors*

W. L. CRAIG

R. T. Vanderbilt Company, Inc.

Starch dispersions, when used as adhesives in paper coating colors, must have the required adhesive strength and must be sufficiently fluid to flow readily at the desired concentrations and temperatures. Untreated gelatinous starches, such as corn, potato, tapioca, etc., as a rule have good adhesive strength but are far too viscous at the concentrations required for most uses. Therefore, starch dispersions must be treated in some manner to reduce their viscosity without excessively reducing their adhesive strength. This liquefaction may be accomplished by enzyme conversion.

There are two general classes of starch

(*) Abridged from a talk given at the annual convention of The American Pulp and Paper Mill Superintendents Association held in Atlantic City, New Jersey, June 15-17, 1949.

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converting, or amylolytic enzymes—alpha amylases (liquefying enzymes) and beta amylases (saccharifying enzymes). The preferred enzyme for starch conversions used as coating binders would be of the first-mentioned type, which acts upon starches to reduce their viscosity by liquefaction and converting them to dextrins with the formation of a minimum amount of sugar. By contrast, the saccharifying enzymes, as represented by malt enzymes, tend to convert a large portion of the starch to maltose or sugar, which has little or no adhesive strength.

Some of the necessary factors to consider when making enzyme starch conversions are:

1. The amount of enzyme required;
2. The optimum *p*H environment;
3. Temperature cycle; and
4. Enzyme inactivation.

In the usual preparation of paper coating colors, it generally is the practice to disperse the clay, or other minerals or pigments, in water by mechanical agitation and then mix the resulting dispersion with a starch adhesive which is prepared separately. If an untreated starch, such as raw corn, tapioca, or potato is to be used as the adhesive, the starch is dispersed in water, an amylolytic enzyme added, and the mixture heated to convert the starch to a composition having the desired physical and chemical properties. This adhesive composition is then mixed into the aqueous mineral or pigment suspension. Enzyme starch conversions for this type of application can be made at concentrations as high as 50% solids.

A new patented process has been developed which consists of preparing coating colors by converting the starch with an enzyme in the presence of minerals and pigments. Coating colors can be prepared with this process at exceptionally high solids contents, having lower viscosities than those produced by conventional methods. Commercial practice has indicated that this new process produces maximum dispersion of the minerals and pigments involved in the coating, and more efficiency is derived from the starch adhesive as indicated by the Dennison wax test.

"Alpha" Protein as a Machine Coating Binder*

WALTER M. BAIN

Soya Products Division

The Glidden Company

The base paper requirements for paper to receive a coating in which "Alpha" Protein is the adhesive, whether for machine coating or conventional coating, usually are the same as when any other of the common coating adhesives are used.

When making up an adhesive solution with "Alpha" Protein some users cut at room temperature; other users cut with heat. The cutting is accomplished in water with the help of alkali. The alkalies commonly used for the purpose are soda ash, ammonia, caustic soda, and borax.

The increased use of alkali up to a certain *p*H causes a viscosity drop in the adhesive solution. This drop in viscosity means better flow on coating machines.

An increase in viscosity of the adhesive occurs on standing; but, in such a case, it decreases rapidly and sharply to its original value upon agitation.

A solution of "Alpha" Protein adhesive is free-flowing at a low water ratio. Also, it contains no dirt, is non-toxic, and is non-corrosive.

When the adhesive is used in reasonable amounts it does not affect the hiding power of either the pigments or the colors to any appreciable extent. In addition, the adhesive sets quite rapidly and dries easily without undue shrinkage or interference with the finish when the paper is calendered.

The keeping qualities of the adhesive are excellent.

If properly handled, an adhesive solution of "Alpha" Protein does not foam. However, should foam occur, it may be dissipated with any one of a number of surface active chemicals—such as pine oil, sulfonated oil, octyl alcohol, diglycol laurate, fusel oil, or some proprietary preparation.

Excessive use of any of the anti-foams may lead to "crawling" of the wet coating, which, in turn, shows up as "fish eyes" in the dried coating. Therefore, it is most important to use them sparingly.

Insolubilizing agents, such as formaldehyde, impart water resistance to the finished coated paper when added to a coating

(*) Abridged from an address delivered at the annual convention of The American Pulp and Paper Mill Superintendents Association held in Atlantic City, New Jersey, June 15-17, 1949.

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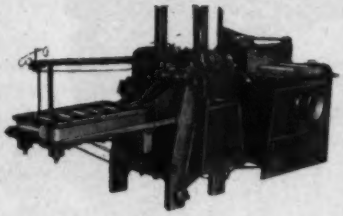

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color using "Alpha" Protein as the adhesive.

While formaldehyde does a satisfactory job of water proofing for most uses, much improved results can be obtained by a two step process. That is, after the paper has been coated and dried, the coated paper is passed through a pair of squeeze rolls running in a hardening bath. The hardening solution is applied to the coated side of the paper, the excess squeezed off, and the paper dried. This hardening bath is usually a buffered papermakers alum solution. It gives excellent results and is the method used in the manufacture of washable wallpaper.

The use of "Alpha" Protein in the paper industry is not confined to coated book paper and coated paperboard. Rather it has found application in beater, tub, and calender sizing, in laminating, and as an adhesive for ground and print coats in the production of wallpaper.

A New Method of Coating Paper Involving Ion Exchange*

D. ROBERT ERICKSON

The history of paper coating up to the present day consists mainly of a series of improvements in mechanical methods of applying a standard coating mix to a web of rawstock. Most of these improvements have been directed at increasing speed of production by allowing high solid coatings to be used so that less water need be evaporated from the sheet.

This method of evaporating the solvent to change a liquid coating to a solid is physical.

The new method is a chemical one. The principle lies in the fact that certain hydroxy alkyl ethers of cellulose and selectively soluble only in a critical concentration of aqueous sodium hydroxide and in no other solvents. These ethers are suitable as adhesive binders for clay and other pigments. They are linear polymers of high molecular weight, are capable of forming self-supporting inherently flexible films and have extremely high adhesive properties. They can, therefore, be used in very small amounts.

Because they are soluble in only one solvent, it can easily be seen that any unbalancing of this solvent equilibrium will precipitate the ether or binder from its solution. Therefore, it is possible, by either increasing the sodium hydroxide concentration, or by decreasing it, or by exchanging the sodium ion of the sodium hydroxide for any other ion, to immediately change a fluid solution to a nontacky solid.

When a coating mix is made using such an adhesive for the binder, the formula would consist of clay or other pigment, dilute aqueous sodium hydroxide as the solvent and a small proportion of the hydroxy alkyl cellulose as the adhesive. Immediately after coating the rawstock with such a coating, the wet surface is contacted by a dampening roll or other suitable method of wetting, with a solution of a neutral or other salt that will simultaneously precipitate the HAC from solution by ion exchange, occluding the clay or other pigment in the smooth precipitated film and also neutralize the sodium hydroxide of the solvent and bring the *p*H of the coating to any desired end point.

The coating may be applied to the coating rawstock by any of the known methods, but preferably by a method that does not apply a pattern.

Immediately following this contact, all excess setting solution and some of the water in the orignal coating is squeezed out by passing the sheet between two rollers, one of which has a somewhat resilient surface. A normal size press is very suitable for this operation. The sheet is then dried, preferably in contact with a drum dryer or a series of paper machine dryer rolls.

Speed at which this method of coating can be used is entirely dependent on the mechanical capabilities of the coater and drying units. The time necessary for the ion exchange to take place is so short that it need not be taken into consideration on speed of coating. The process is ideally suited for "on the machine" coating especially on machines that already include a size press. The process is also ideally suited for simultaneous double side coating as no sticking is possible on the drying drums.

Because the coating has been applied as a smooth film and has been solidified while in that condition before penetration into the rawstock, it does not require supercalendering. Because of this fact that it has not been transparentized, embrittled, glazed and compressed, it has much greater brightness, more opacity, more flexibility, much greater affinity for ink, much better adhesion of ink to the surface, better lay of ink on the surface, much better compressibility of the coated sheet to save make-ready time on the press, and uniformity of finished product—due to the fact that the adhesive is stable indefinitely both as to viscosity and as to resistance to bacterial growth.

When suitable unpigmented coatings are applied by the same process to paper or board, the resultant products are oil-proof, grease-proof, and solvent-proof.

(*)Abridged from a talk given at the annual convention of The American Pulp and Paper Mill Superintendents Association held in Atlantic City, New Jersey, June 15-17, 1949.

The Place and Future of Machine Coating in the Industry*

B. R. NEWCOMB
John Waldron Corporation

While paper is coated for many purposes, principally it is coated on the machine as an upgrading proposition to afford better printability, brightness and uniformity of surface texture.

In 1938, the industry had available, for coating on the paper machine, four main processes. Firstly, the process wherein a stiff ink printer method of roll distribution coated two sides of the paper, first one side and then the other, after which the paper passed through a short air dryer before going over the paper machine dryers. Secondly, a process which consisted in applying an excess of coating to the surface of the sheet by means of a roll, the excess coating being removed by means of a wiping blade or revolving rod. The third process was the rotogravure offset printer. The fourth process was the well known squeeze roll appli-

(*)Abridged from a talk given at the annual convention of The American Pulp and Paper Mill Superintendents Association held in Atlantic City, New Jersey, June 15-17, 1949.

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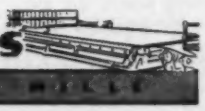

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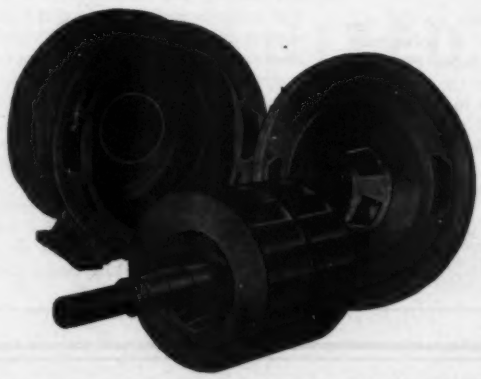


NASH VACUUM PUMPS HAVE ONE MOVING PART

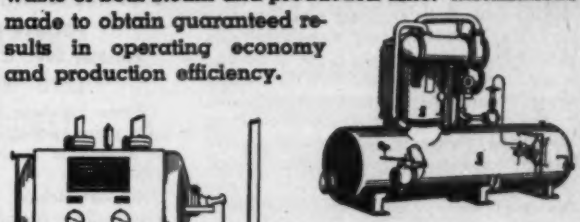
Operating advantages made possible by the Nash principle, and present in no other type of vacuum pump, permit a new level of operating economy. Nash Vacuum Pumps have but one moving part, a rotor cast in one piece, and revolving without metallic contact. There are no valves, no pistons or sliding vanes, no internal parts requiring wear adjustment or lubrication.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

LOW COST PRODUCTION

WITH IMPROVED PRODUCT QUALITY

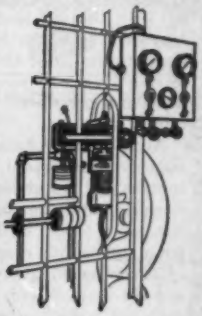
• Stickle Equipment for paper mills provides steam at lower cost and permits production of a product of improved quality at high speed. Stickle units and Stickle systems have been developed to make the generation of steam more economical, its application to production more effective, and to eliminate unnecessary waste of both steam and production time. Installations made to obtain guaranteed results in operating economy and production efficiency.



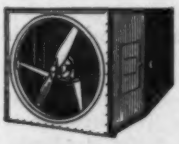
(Above) Stickle Open Coil Heaters for low cost heating and purification of boiler makeup.

Stickle Vacuum Differential Drainage Systems afford a drying range of 19" of vacuum to 12 lbs. steam pressure, and eliminate B.T.U. loss by returning condensate to boilers or feed water heater at high temperature.

Stickle Automatic Tension and Thermal Control Systems provide uniform drying at a predetermined moisture content. Combined with Stickle Differential Drainage Systems, this means continuous production at high speed and at a high quality level.



Stickle Heat Reclaimer uses heat from paper machine vapor to heat water for processing purposes—turning otherwise wasted B.T.U.'s into a cost-reducing facility.



ASK FOR BULLETINS

Stickle Bulletin No. 160 and 160-A describe the various units and systems from which an installation adapted to meet specific problems and conditions may be composed. Ask for them. A discussion of your problems with an experienced Stickle engineer will entail no obligation.

STICKLE STEAM SPECIALTIES COMPANY
2215 Valley Avenue • INDIANAPOLIS 18, INDIANA

Successfully Serving Paper and Paper Board Mills for More than 40 Years

STICKLE EQUIPMENT

• Supplies Rapid Circulation of Steam through Dryers • Provides Rapid Removal of Condensate and Gases • Increases Production • Eliminates Steam Waste • Reduces Drying Pressure to Minimum • Improves Quality of Product • Gives Visible Operation of Dryers • Provides Sensitive Automatic Control • Assures Accurate Modulated Temperature • Holds Moisture to Predetermined Content.

cation, which, however, has the disadvantage of applying only very light weight coats of low solids content. All of these methods are still in use today.

More recently, however, new processes of coating are coming into the field; they permit the use of the high solids content so desirable to reduce to a minimum the drying problem, on-the-machine coating, they allow heavier weights of coating to be obtained in a single application, they produce uniform thickness of coating regardless of uneven caliper, and the apparatus is simple to install and relatively inexpensive to purchase, maintain and operate, the operation being carried out without any additions to the paper machine crew.

Coating on the paper machine has a future readily apparent today. Readers are becoming more conscious of eye fatigue and advertisers who want to use color are going to demand coated newsprint. For low cost, this coating must be done by paper machine application.

Presently, off the machine converters are producing packaging materials which are rapidly replacing glass and metal containers. Formulations have been developed to impart the properties of grease-proof, moisture-proof, vapor-proof, rupture-resistant, abrasion-proof, vermin-proof, heat-resistant, light-proof, and proof against age deterioration, or a combination.

One of these newer types of coaters adaptable for machine coating operation is the air blade. In the air blade type the board or paper is roll coated with an excess of the coating color, this coating is then leveled out by a thin air blade while the sheet is supported against a backing roll, and the high velocity jet of air planes off the excess leaving a uniform weight of coating across the sheet regardless of the variations in caliper.

Another form of coater still in the early stages of commercial use, but which has considerable probability of emerging into a machine coating instrument, is that in which one, or a series, of knives are supported upon a pneumatic diaphragm with the sheet of paper traveling between the diaphragm and the knife or knives. The diaphragm is sustained under a few ounces of pressure which levels out the surface to be coated and provides a resilient support.

In addition there is a third new method which, while still in the development stage, appears to offer a wide range of possibilities contributing to the future of machine coating, namely the Erickson "ion" exchange process.

With these new methods, and with new substances such as the resins, the latices, the silicones, a wide range of plastics, improved adhesives, pigments and chemicals and processes of using them—machine coating, while still in its infancy, offers a tremendous opportunity for immediate profit realization through new product development on existing machinery with a minimum of capital investment.

Latex as an Adhesive for Machine Coating of Paper*

ELMER K. STILBERT

Plastics Div., Coatings Tech. Serv.
The Dow Chemical Company

Latex has been used in largest volume in coating paper off the machine, both alone and in combination with the other adhesives.

In off-machine coating, latex is used principally to improve the smoothness, gloss, flexibility, or wet rub resistance of the coating. It may also be used to make a coated sheet with superior gloss ink or varnish "hold out" and still retain satisfactory printability. Where such improvements are desired in machine coated papers, the use of latex is just as strongly indicated as it is in off-machine coated papers.

Three types of machine coating where latex may generally be used as a modifier for other adhesives are:

1. Size press coating.
2. Doctor blade coating.
3. Print roll coating.

Size Press Coating

The use of the size press on the machine as coating equipment is not considered to give a true coated paper. However, such a coating does fill in the surface of the paper and may be used to improve the printability of an uncoated printing paper or as a precoating to be followed by off-machine coating.

Where the process is used to improve the printability of uncoated paper, Dow Latex 512K offers some very desirable advantages. It has low viscosity at 45% solids and has less tendency to soak into the paper since it is carried in the water as solid particles in the same fashion as pigment particles are carried in the pigment slurry. These properties permit putting a heavier coating on the paper surface than can be obtained with starch alone.

Where the process is used for precoating to be followed by off-machine coating, the use of 512K offers still other advantages. Since the precoat is not supercalendered and is to be overcoated, entirely new and unusual binder combinations are possible.

Doctor Blade Coating

The best known use of the doctor blade coater on the machine is for the coating of paperboard with the Champion coater. The use of 512K in this equipment does not require detailed discussion since it is used as a modifier for regular protein coating colors at low viscosities. The latex is used primarily to obtain better "bender" and cleaner cutting in carton manufacture.

Two of the principal properties which adversely affect the printability of coated paperboard are the light coat weight and the roughness of the board surface. With a smoother board surface and equipment to apply 3 to 4 pounds of coating/1,000 sq ft there is positive evidence that changes in coating formulation may be helpful. In such coatings 512K will aid smoothness, finish, gloss ink and overprint varnish "hold out" and improve the abrasion resistance of the printing on the finished carton.

Print Roll Coating

The most complex coating method is print roll coating which may further be divided into multiple roll coating, gravure roll coating, and combinations of the two. The methods are similar in that high solids coating colors are used and relatively high shearing forces are involved in applying the coating to the paper or paperboard.

Latex adhesive for use in print roll coating must exhibit the highest order of mechanical stability and, even then, must be properly handled in order to perform its function adequately.

Each machine must be treated individually and experiments carefully carried out to obtain the desired improvements in printing properties of starch-512K coated papers.

(*) Abridged from a paper presented at the annual convention of The American Pulp and Paper Mill Superintendents Association on June 15, 1949, in Atlantic City, New Jersey.

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UNIFORM • SUPERIOR • DEPENDABLE

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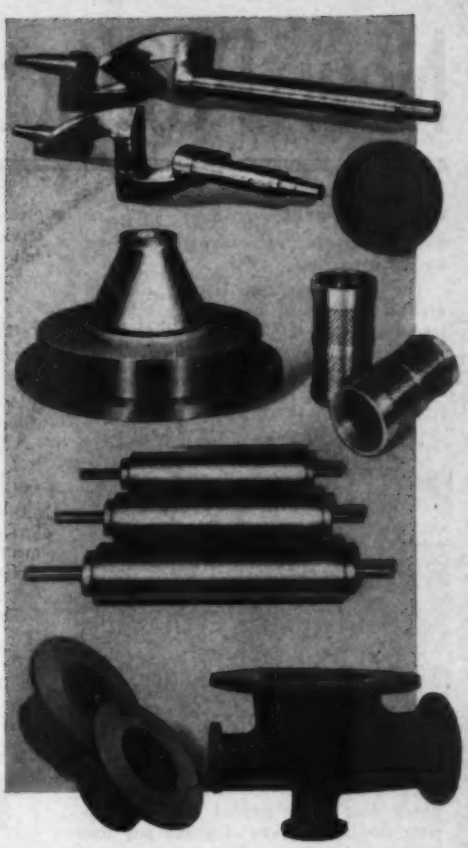
CORROSION RESISTING · HEAT RESISTING · WEAR RESISTING

MISCO engineering, metallurgical and production facilities are at your service. We are pleased to furnish specific information on the proper analysis, design and application of stainless steel castings for best resistance to corrosion, heat and wear. Bulletins and engineering data sheets available upon request. Let us know your needs.



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LARGE AND MEDIUM WEIGHT STAINLESS STEEL CASTINGS
CENTRIFUGAL CASTINGS

ALLOY CASTING DIVISION
Michigan Steel Casting Company
1992 Guoin Street • **DETROIT 7, MICHIGAN**
One of the World's Pioneer Producers and Distributors of Heat and Corrosion Resisting Alloys

ORGANIZED SAFETY PAYS!

The accident rates on non-member industrial plants average 73% higher than the rates of National Safety Council members. Yet Council services for an entire year frequently cost less than a single accident.

The 315 members of the Pulp and Paper Section cordially invite you to share the safety materials, services, information exchange, and activities which they have found so valuable in their efforts to prevent accidents to their employees.

Please write for information today.

NATIONAL SAFETY COUNCIL
20 N. WACKER DRIVE • CHICAGO 6, ILL.

New Products . . . . . .

Gripping Forks

Positive gripping of load until the load weight is relieved.

The Buda Company, Harvey, Ill., has available pallet-less hydraulically operated load handling forks for lifting bricks, barrels, boxes and bags for all its fork lift truck models.

The all-purpose gripping forks come in three main styles: two forks for holding the sides of a barrel or a unit load of package goods, four rubber padded forks for gripping the bottom tiers of bricks and four semi-curved forks for lifting two rows of bags.

Bearing Lubrication

Corrosion resistant grease for general purpose bearing lubrication.

Norma-Hoffmann Bearings Corporation, Stamford, Conn., has announced the availability of its Norma G-66 "Stability-Tested" grease for bearing lubrication.

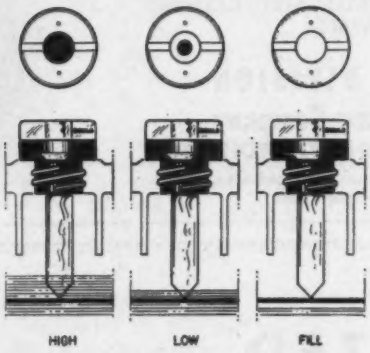
Originally developed for use in the Norma-Hoffmann ball and roller bearings to provide lubrication over a wide temperature range without separation, drying out or hardening, Norma G-66 is now offered to bearing users for lubricating grease-packed bearings as well as unsealed bearings. It is highly resistant to oxidation in storage as well as in service and is insoluble in water and will not emulsify or aerate in the presence of condensed moisture. The grease is supplied in tubes for convenient servicing of bearings in the plant and field and in large containers where greater quantities are required.

Plastic Vent Plug

Saves time by eliminating unnecessary addition of water to batteries.

A new translucent plastic vent plug, named the "Televel," has been announced by Gould Storage Battery Corp., Trenton, N.J. Maintenance men can determine electrolyte levels without unscrewing the "Televel."

The translucent plug has a cylindrical element which projects down into the electrolyte. The portion of the element which extends into the electrolyte is cone-shaped. When the electrolyte is at the correct level,

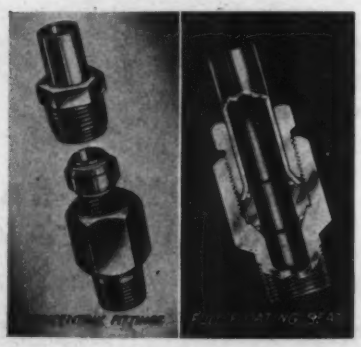


the cone is completely covered. Light waves traveling down the element are absorbed into the electrolyte and not reflected. The top of the plug shows a black circle, indicating that no water is required. When the electrolyte is low, the cone is not covered by the electrolyte and light waves are reflected back up the element from the electrolyte surface. A white circle appears, indicating that water is required.

Tube Fittings

For use in lines carrying highly corrosive liquids and gasses.

The Special Screw Products Co., Dept. 28, 5445 Dunham Rd., Bedford, Ohio, has



available a new line of stainless steel couplings, produced in type 316 Stainless Steel, an acid resistant alloy, and known as Koncentrik Flared Tube Fittings.

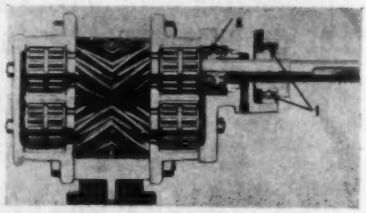
A patented floating seat, that automatically adjusts itself to the tube flare, insures true concentricity and full circle, metal-to-metal contact because the seat is wedged into position as the tube nut is tightened. Resilient Teflon rings act as an extra safety seal.

The fittings are also available in Carpenter No. 20 stainless. Unions, couplings, tees, and elbows for line sizes to 1 in are standard, with larger sizes special.

Inboard Bearing

Takes load off the main pump bearings.

Worthington Pump and Machinery Corp., Harrison, N.J., has available a new inboard bearing construction for its line of GR rotary pumps, that is especially adapted to

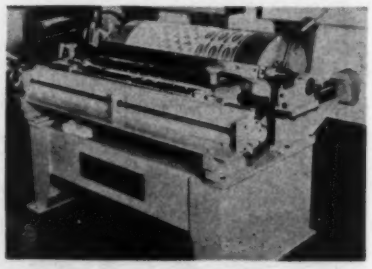


overhung multi-V-drives or other drives which impose unusual radial load on the pump shaft. The adapter type bearing is designed so that the inner race is locked to the drive shaft, close to the load center. This eliminates necessity of the user installing separate outboard pedestal bearings and base. The new bearing incorporates a dripproof mechanical seal, automatically adjusted and subject to suction pressure only, making it suitable for high pressure or high vacuum services.

Proof Presses

Simplifies production and improves quality of rotogravure cylinders.

American Type Founders, Klingrose Gravure Div., Elizabeth B, N.J., have made



commercially available the rotogravure cylinder proof press. According to this company, preprinting proofs can be pulled of engraved cylinders, and corrections made without mounting cylinders on major production equipment, with this press.

Rotary Wire Brush

Marks outstanding change in wire wheel brush construction.

Hewitt-Robins Inc., Hewitt Rubber Div., Buffalo 5, N. Y., has introduced to the

A Complete Service

CHICAGO ELECTRIC

Carries a complete stock of rebuilt equipment of the following types:

- SQUIRREL CAGE MOTORS
- SLIPRING MOTORS
- SYNCHRONOUS MOTORS
- DC MOTORS
- M. G. SETS
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SALES DISTRIBUTION
of
"REBUILT"
ELECTRICAL POWER EQUIPMENT

Here's a partial listing of our stock of quality

REBUILT SLIPRING MOTORS

H.P.	Make	Type	Volts	Speed
400	Gen. Elec.	MT-412	2300	440
400	Al. Chlrs.	ANY	4000	514
350	Gen. Elec.	IP	2300	720
300	Westghse.	CW	2300	367
300	Al. Chlrs.	ANY	2300	720
300	Westghse.	CW	440	900
250	Gen. Elec.	IM	2300	450
250	Cr. Whlr.		440	600
250	Ideal.		440	720
125	Gen. Elec.	IM	2300	720
100	Westghse.	CW	440	575
100	Al. Chlrs.	ANY	440	720
100	Gen. Elec.	IM	440	900
75	Gen. Elec.	IM	440	514
75	Cr. Whlr.	25Q	440	585
50	L. Allis	GH	440	870
35	F. Morse		440	1800
30	Lincoln	Crane	440	900
30	Gen. Elec.	MT	220	900

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CHICAGO *Electric Co.*

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BOARD MILL SCREENS

Probably more Board Mill Screens are equipped with **Fitchburg NEW TYPE-DUPLEX SLOT Screen Plates** than any other type of plate.

High capacity . . . permanent true slot alignment . . . Freedom from "strings" and plugged-up slots.

Get a full day's work from your screens with these remarkable plates. Furnished in tough, "Fitchburg Bronze," plain or chromium plated.

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Screen Plate Co., Inc.
301 South Street
Fitchburg
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Let's talk about one of your customers

Suppose he is a printer.

He knows the finish he wants on the paper to get best printing results. He knows that a sheet is no better than the finish.

With Butterworth Calender Rolls in your stack, you can see the difference—in more uniform surfaces, better calendering.

Your production records will show you the economy of standardizing on Butterworth Rolls. Fewer delays and breakdowns. Longer service. Less labor time spent in making changes.

Butterworth Calender Rolls are made of the finest materials available, long staple cotton free of any foreign matter and top quality paper of high rag content. Pre-tested for smoothness, hardness and density. Locked on the shaft under tremendous pressure—they can't slip or come loose.

Call us on your calendering needs—new rolls or refills. Prompt service. Superior workmanship.

For full information, write or call H. W. Butterworth & Sons Company, Philadelphia 25, Penna.—Providence Division, Providence, R. I. : : Charlotte, N. C., 1211 Johnston Building In Canada—W. J. Westaway Company, Hamilton, Ontario

Butterworth Calender Rolls

market a new rotary wire wheel brush with bristles imbedded or locked in rubber centers, called the Rubberlokt.

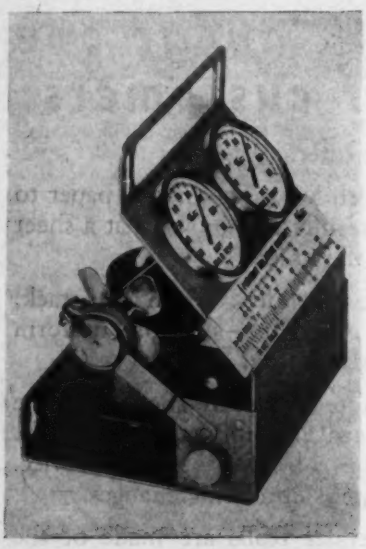
The manufacturer claims that due to the flexibility of the rubber core the wire bristles return upright after each contact with the surface to be brushed, thus increasing brush life. Bristles are not prematurely broken and thrown out and they may be worn down to the rubber flange. Less pressure is needed to contact the wheel to the surface, which results in greater speed, as there is no slow-down of the motor and it thus produces work with a more uniform finish. Less vibration offers greater protection for tool bearings and arbor shafts.

The almost complete retention of wire bristles reduces the number of flying wire points and is a much safer tool for the operator, according to the manufacturer.

Humidity Indicator

No calculations required.

Accurate humidity readings can now be obtained in factories, shops, and small, confined spaces near, or in operating machinery by a new motor-operated fan developed by Weston Electrical Instrument Corp., 617 Frelinghuysen Ave., Newark 5, N.J.



The small fan, powered by dry cells, can be attached to any Weston relative humidity indicator. Air is moved over the indicator's wick in sufficient volume to permit obtaining stable readings within 30 seconds, thus enabling the adjustment of the humidifiers and air-conditioning equipment for best results. Readings are obtained on the instrument's simplified slide rule.

Indicators are available with or without the auxiliary fan.

Work Glove

Gives maximum protection from dangerous acids, caustics and other irritants.

The B. F. Goodrich Co., Akron, Ohio, has available a new rubber coated canvas glove curved to fit the hand that is claimed to give greater finger dexterity than other work gloves.

The glove is coated with Neoprene which not only gives maximum protection from acids, and other irritants but also makes it resistant to greases and oils. Inside of glove is lined with flannel from finger tips to cuff ends for absorption of perspiration thus eliminating sticky fingers and clammy hands. The company claims this glove is widely used in the chemical, paper and pulp, mining and construction industries, etc.

Coating Machines

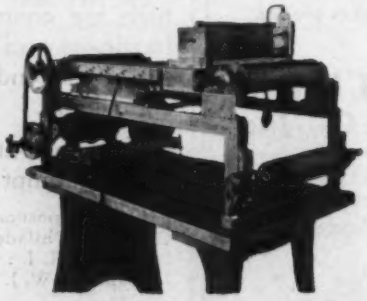
Laboratory units provide test data on raw stock and coating formulations.

Two new developments, the Microjet Laboratory coater and Diatron coater, have been announced by John Waldron Corp., New Brunswick, N.J.

The Microjet operates by applying the coating compound to the paper in an amount in excess of the required final weight of coating. No roll, doctor or brush touches the coated surface after it passes

Microjet Coater

in front of the Microjet air blade, thus the coating is not disturbed and is entirely free of marks and scratches of any kind. This unit is furnished complete with motor driven color roll drive and automatic air supply for the nozzle, and can be equipped with a simple unroll and winder to provide continuous web operation. Coating speed is 400 to 800 fpm.



Diatron Coater

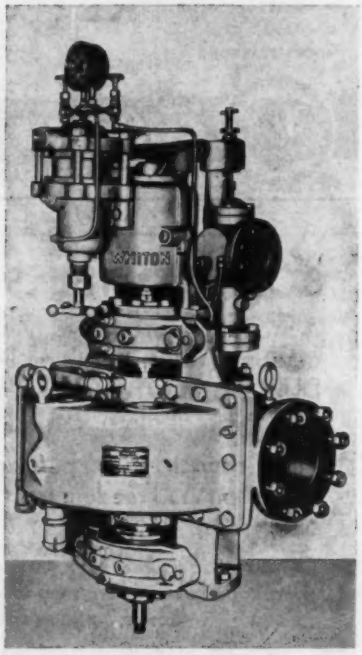
The Diatron coats all papers having sufficient strength to be pulled between the diaphragm and the coating knife or roll, as the case may be. It will coat closely woven textiles or filled textiles in which the interstices are not so open as to permit the coating to strike through. This unit is designed to handle materials which may have an irregular caliper across the width, and is especially useful for short runs and for different colors or different types of coating application. It is readily cleaned in a minimum of time and can be set up for an entirely different type of coating, thus giving it great flexibility. The standard model includes unroll and coating head. A radiant heater of 1566 watts input and motor driven reroll of ½ hp at 110 volts, a-c, are available for use with this equipment.

Steam Turbine

Equipped with both constant speed and emergency governors.

Whiton Machine Co., New London, Conn., has developed a small, compact, rugged vertical steam turbine which is capable of developing horsepower ratings up to 90 b-hp covering a wide range of speeds.

The unit is available in either semi-steel or cast steel and can take thrust loads in either direction up to approximately 1500 lb. and can easily be changed to take even higher thrust loads. Pump governors can be built into the machine.



Equipment includes a bolting flange at the lower part of the casing to permit bolting to the flange of the driven unit.

Carton Adhesive

Can be used cold, requiring no heat on the glue pans.

Paisley Products, Inc., 1770 Canalport Ave., Chicago 16, Ill., reports that its new adhesive "Cartontite" is now in production at its Chicago, New York, and Minneapolis plants.

The product is described as a fluid brown adhesive, prepared from a fully converted

Another Use for KALAMAZOO GLAZED TILE

Showing a machine chest—refinery stock chest and a raw stock chest all being built of Kalamazoo Glazed Tile.

Kalamazoo tile is ideally adaptable to all three types of chest due to extreme strength, the easy-to-keep clean surface and low maintenance costs.

A Series of 3 New STOCK CHESTS

KALAMAZOO TANK & SILO CO.

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SULPHITE MILL ACID PLANTS

SULPHUR BURNING PLANTS
JENSSEN TWO TOWER ACID SYSTEMS
GAS COOLERS—SURFACE AND SPRAY TYPE
JENSSEN PRESSURE ACID SYSTEMS
JENSSEN AUXILIARY PROCESS TOWERS
RECOVERY PLANTS—COOKING ACID

SOLUBLE BASE ACID PLANTS
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JENSSEN SO_2 ABSORPTION SYSTEMS

FOR BLEACH PLANT APPLICATION
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H. WATERBURY & SONS CO.
ORISKANY, N. Y.

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ESTABLISHED 1885

LUBRICATING SYSTEMS
for
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THE STANDARD OF THE INDUSTRY FOR MORE THAN

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Wherever high speed production schedules are consistently met . . . or exceeded . . . there's usually a Bowser lubricating system on the job.

Bowser lubrication engineers are always at your service!

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1315 Creighton Avenue, Fort Wayne 2, Indiana

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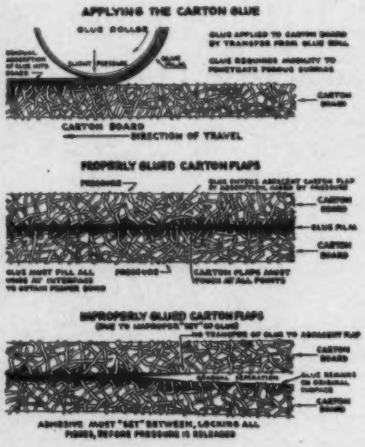
DARNELL CASTERS

A SAVING AT EVERY TURN

DARNELL CORP. LTD.
LONG BEACH 4, CALIFORNIA
60 WALKER ST., NEW YORK 13, N.Y.
36 N. CLINTON, CHICAGO 6, ILL.

dextrine base, weighs 10 lb. to the gal. and can be used as received or diluted approximately 10 per cent with water. It is odorless and non-toxic, and has sufficient fluidity to flow properly through pumping systems, from floor reservoir to machine gum pot and return.

It is reported that "Cartontite" has a working range so designed that the "gel" or setting of the adhesive film coincides with the timing of the pressure phase of the carton sealing machine. The instant tack



of the adhesive on all normal chipboard carton stocks, holds flaps securely on contact without danger of loosening through subsequent filling and conveying operations. It is further claimed that this product is non-foaming, even after lengthy agitation and repumping through bum boxes and pipe lines, thus eliminating stoppages for clean-up where equipment must operate through day and night shifts. Testing samples are offered by the manufacturer to those firms who furnish blank cartons for inspection, plus information as to make of machine and length of time under compression, in order that proper instructions can be given to secure peak performance results.

Pulp Press

Claimed to be only machine of its kind in paper pulp field.

Fulton Iron Works Co., St. Louis, Mo., is now producing two sizes of its new roll-type pulp press.

This equipment takes pulp of usually low consistency from the digesters and dewaters the pulp and wrings out the black liquors to an average resulting pulp of high consistency. During this single stage process, any long fibers are reduced in length and beginning fiber separation is noted in the processed pulp. Recent laboratory examinations of the expressed black liquors have shown that they contain as high as 90 per cent of the cooking chemicals. By concentrating this black liquor to a high degree it is claimed that the problems existent regarding stream pollution are greatly minimized as the total black liquor affluent discharge has been reduced in some instances as much as 75 per cent.

Another important phase of the roll-type pulp press is its ability to reduce the long fibers and create beginning fiber separation thus enhancing freeness and reducing the initial load on the finish refiners by delivering a more homogenous pulp. Experiments conducted by one user in the strawboard field show that the press has a great capacity as a raw straw-cutter, and can cut straw wet or dry in the as-baled condition and cracks or flattens the nodes as well as the cut straw.

Another remarkable result recently obtained was that wood-mill refuse consisting of pieces of fir and western pine wood and bark of high moisture content were dewatered to a moisture content of below 45 per cent. The idea back of this processing was utilization of this material as broiler fuel and obtaining minimum dryness in order to get as great a btu production as possible.

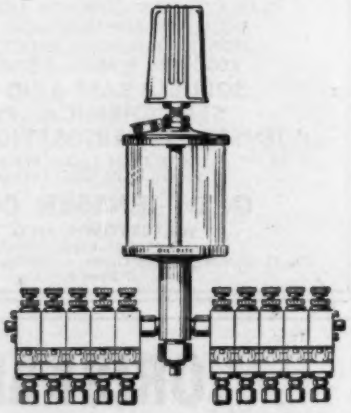
This new press is manufactured in two standard sizes. Capacities vary according to particular material to be processed and specific results required.

Lubricating Device

Provides automatic centralized lubrication

Oil-Rite Corp., 3495 South 13th St., Milwaukee, Wis., has a new addition to its line of lubricating devices known as the Electro-Oiler, which is entirely automatic in operation.

Oil is released from the reservoir by a solenoid operated valve through single or multiple sight feed valves to a number of individual bearings to be lubricated. There is no toggle to be turned on or off, and the single reservoir will feed up to 24 bearings thus replacing many individual oilers. Oil fed to each bearing can be conveniently and individually adjusted as well as observed at one station through the



sight feed valves. The unit is applicable to machine tools, punch presses, printing presses, conveyors, chain lubrication, etc.

The Electro-Oiler can be operated manually in case of power failure. It is easily dismantled, and can be cleaned simply by removing the pipe plugs at each end of the sight feed valves and the bottom of the shank.

Standard models are available in five body sizes with capacities from 9 oz to 1 gal, up to 24 feeds, for standard voltages and frequencies.

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5 Ingersoll-Rand High Pressure 8 G115, 1260 CFM at 8 oz., 5 HP. $205
4 N. American—308 B 1-½, 100 CFM at 8 oz.....$55

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2 Lewis Shep. WHL 11-54....	5000#	27"	54"	11"	14"	$155
Master Jacklift; mechanical multistroke, hydraulic release check						
5 Weld Bilt Pallet.....	4000#	27"	42"	3½"	6½"	$175
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Book Reviews

THE CHEMICAL FORMULARY. Vol. 8. Edited by H. Bennett. Published by Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N.Y. 1948. 436 pages. $7.00.

This is the eighth book in a series intended to place at the disposal of the chemist many chemical formulas which would otherwise require a great amount of research and study to locate. Many valuable and practical commercial formulas and recipes for making thousands of products in many fields of industry are presented in simple form.

Contents include chapters on the formulas of adhesives, cosmetics, drug products, emulsions and dispersions, farm and garden preparations, food products, ink and allied products, insecticides, fungicides and weed killers, leather treating preparations, lubricants and oils, construction materials, metals and their treatment, paint, varnish, lacquer and other coatings, paper, photography, plastics, rubber resins and waxes, polishes, pyrotechnics and explosives, soaps and cleaners, textiles and also a section of miscellaneous formulas. Included, also, are many German formulas released by Allied Intelligence Groups.

This book also contains a list of tables, a short article on trade-name chemicals, a chapter on chemical supplies and where to buy them, and a list of sellers of chemical supplies.

BARRELL'S PAPER ANNUAL. Vol. 8, 1949-1950. Edited by William Bond Wheelwright. Published by William L. Barrell Co., Lawrence, Mass. 55 pages. Free.

The edition contains the second in a series of illustrated articles entitled "Great American Research Laboratories" and describes the experimental station of E. I. du Pont de Nemours & Co. As in previous issues, it contains a directory of officials of the 33 Paper Industry Associations. A brief description of the pulp and paper courses provided by the University of Maine, New York State College of Forestry, Institute of Paper Chemistry and Western Michigan College of Education is included.

POWER CAPACITORS. By R. E. Marbury. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N.Y. 1949. 205 pages. $3.50.

This book covers the fundamental working principles of capacitors, the materials used in the manufacture of power capacitors and the characteristics of the completed units. It traces the history and development of power capacitors and their applications to power systems. Selection and use of fuses and breakers to function with capacitor units, and the merits of different means of automatically switching capacitor banks with reference to system requirements, are discussed.

This book will help the plant engineer to gain a better understanding of the significance of "power factor" and the gain to be made by the proper use of power capacitors to improve power factor. It gives the utility and operating and maintenance engineers useful information on the gains that can be realized by raising the system power factor or the power factor of specific circuits.

STANDARDS OF HYDRAULIC INSTITUTE. Published by Hydraulic Institute, 90 West Street, New York 6, N.Y. 1948. Paper cover. 8½ x 11. $3.00.

This book, the Institute's eighth edition, is a compilation of six pamphlets which set forth the standards of the various products and appliances with which it is connected.

Pamphlet No. 1 is a general data section. Here are defined the purposes and activities of the Institute and its publications. No. 2 contains standards for centrifugal pumps. This section deals with types, materials, nomenclature, specific speed, instructions for installation and operation, test code, and many other basic points. There are charts and graphs. No. 3 is much the same as No. 2, but covers standards for rotary pumps; No. 4 is reciprocating pumps; No. 5 is a data section with full information on materials required for pumping various types of liquids and the friction of paper stock in different sizes of cast iron pipe. No. 6 is devoted to standards for pipe friction. This section is highly illustrated with a large number of data tables.

TRANSLATION OF SECTIONS ON GLYCERINE AND SOME GLYCERINE DERIVATIVES from Beilstein's Handbook of Organic Chemistry. Translated by A. B. Cramer, V. K. Root and E. Tarlowsky. Published by Glycerine Research Committee of the Association of American Soap & Glycerine Producers, Inc., 295 Madison Ave., New York 17, N.Y. 1949. 210 pages. 8½ x 11½ in. $2.50.

Translated into English for the first time, this book comprises the sections on glycerine and some glycerine derivatives from Beilstein's "Handbook of Organic Chemistry," 4th edition. The book is thoroughly indexed and covers the literature to 1910 in the main work, and in the First Supplement 1910-1919, and the Second Supplement 1920-1929, Volumes 1-6. Included are sections on the occurrence, formation, preparation and purification of glycerine as well as information on physical, chemical and biochemical properties. The book also contains seven pages listing abbreviations for literature references and a seven-page index of glycerine derivatives.

VOCABULAIRE PAPETIER. By M. Argy and H. L. Supper. Published by *La Papeterie*, 9, Rue Lagrange, Paris, France. 231 pages. $2.70 postpaid.

This paper-bound dictionary contains a technical vocabulary of words and terms used in the paper and graphic industries. It is divided into two parts, each part containing more than 5,000 words.

The first section is French-English, by Mr. Argy. It is the result of several years of work compiling terms from books on pulp and papermaking, papermaking equipment, technical magazines, catalogues, correspondence, and even trips to England. The second section is English-French, by Mr. Supper. His list of terms was gathered during the course of several long visits to the United States and during a two-year term spent as technical adviser to the Chief of the Services of Supply, U. S. Army.

At the end of the book is a table of conversion of British and American measures to French metric terms.

Booklets and Pamphlets

CORN—FACTS AND FIGURES. Published by Corn Industries Research Foundation, 3 East 45th Street, New York 17, N.Y., 1949. 48 pages. Free, but limited distribution. Statistics and charts on the U.S. and world crop have been brought up to date. Many pages of text discuss the importance of corn in America to the farmer, to livestock, and to industries. Some 500 uses of corn products, as food for humans and as the raw materials for many industries, are listed. A final chapter deals with the probable future significance of corn in the American economy.

EMPLOYEE COMMUNICATIONS FOR BETTER UNDERSTANDING. Published by National Association of Manufacturers, 14 W. 49th Street, New York 20, N.Y., 1949. This 32-page, free booklet presents a program which industry may follow in order to help employers to keep their employees fully informed on the basic facts about our individual free enterprise system. It also explores a question which has received much attention—that of keeping employees informed about their companies' operations and policies.

1949 SUPPLEMENT TO LINCOLN'S INDUSTRIAL-COMMERCIAL ELECTRICAL REFERENCE BOOK. Published by The Electrical Modernization Bureau, 41 East 42nd Street, New York 17, N.Y., 1949. This booklet presents the complete changes from the 1940 to the 1947 National Electrical Code, as given in the Electrical Reference (1941 Edition). Basic tables have also been revised.

SYMPOSIUM ON USEFULNESS AND LIMITATIONS OF SAMPLES. Authorized reprint from copyrighted proceedings of the American Society for Testing Materials, Volume 48. 1948. This 39-page booklet contains three papers given at the Society's 51st annual meeting and their accompanying panel discussions: Sampling and Its Uncertainties (S. S. Wilks); On Variation in Materials, Testing, Sample Sizes (Leslie E. Simon); and The Amount of Inspection as a Function of Control of Quality (G. R. Gause). Copies are available from A.S.T.M., 1916 Race Street, Philadelphia 3, Pa., at $1.00 per copy.

THE ECONOMIC FACTS OF LIFE. By Merle D. Schmid. Published by the Industrial Management Engineers, 111 W. Jackson Blvd., Chicago 4, Ill., 1949. Issued as a series of four booklets: The Why of Work; Buying With Hours; We Have What We Make; and

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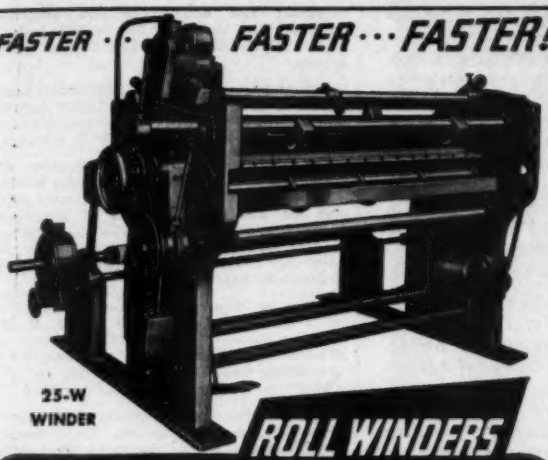

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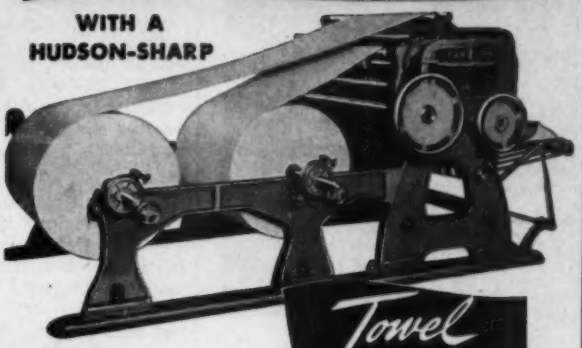

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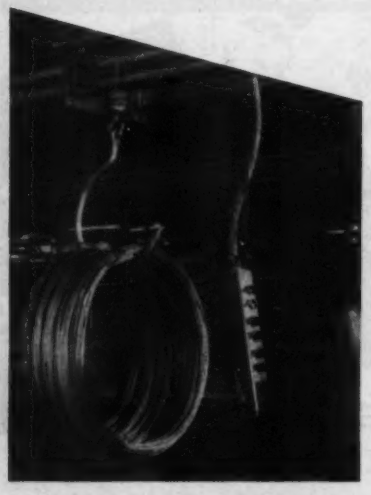

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MOISTURE RELATIONS IN THE MANUFACTURE AND USE OF CORNSTALK INSULATING BOARD. By O. R. Sweeney and L. K. Arnold. Published by Iowa State College of Agriculture and Mechanical Arts, Ames, Iowa, 1948. 34 pages. Free. Methods used in the College laboratory experiments for producing insulating board from cornstalks are outlined briefly. Tables and graphs are included giving data on moisture absorption under certain conditions and various humidities.

TRANSPORTATION—THE FRONT LINE OF THE ENTERPRISE SYSTEM. By John H. Frederick. Published by Transportation Association of America, 130 N. Wells Street, Chicago 6, Ill., 1949. This 20-page booklet, which may be obtained from the Association for 50 cents per copy (less in quantities), describes how each form of transportation has developed and what its present place is in the nation's economic system. It also tells about the status of regulation of each form and clarifies the problems created by modern conditions and the complex policies affecting transportation.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY AND PAPER WORLD *lists the following catalogues, bulletins, and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Hose. Chicago Metal Hose Corp., 1315 S. 3rd St., Maywood, Ill.—Bulletin CMH 100 describes and illustrates this company's refrigerant service hose which utilizes a neoprene packed corrugated steel core for gas-tight strength and flexibility. Construction is shown in detail, and sizes and list prices are given.

Strainers. Elliott Company, Jeannette, Pa.—Bulletin A-13 describes and illustrates new twin strainers manufactured by this company. Includes a pressure drop curve graph, dimensions of all types and sizes and an inquiry data card to request recommendations and prices.

Valves. Minneapolis-Honeywell Regulator Co., 4489 Wayne Avenue, Philadelphia 44, Pa.—24 page Bulletin No. 10-1 contains descriptive photographs and schematic diagrams of regulating and float valves. Complete dimension charts are given. 24 page Bulletin No. 47-1 describes and illustrates the Belfield single seat pilot balanced regulating valves. Includes schematic drawings and dimension charts, and circumferences and areas of circles and the flange dimension charts. 31 page Bulletin No. 700-1 offers descriptions and drawings of the diaphragm motor controlled valves together with standard and special control applications for diverse operating conditions. Includes dimension tables and ratings, shipping weights, and cubical measurements.

Water Treating. Infilco, Inc., 325 W. 25th Pl., Chicago 16, Ill.—28 page Bulletin No. 1825 on the development of the Accelator produced by this company. Its principle, characteristics, advantages, design considerations, operation and applications are explained. Includes flow diagrams for typical installations, specifications and installations photographs.

Extinguisher. American-LaFrance-Foamite Corp., Elmira, N. Y.—2 page leaflet describes and illustrates the Alfco Fire-Gun extinguisher. Sectional drawing of this unit is included.

Gages. Williams & Hussey Machine Co., Star Brass Div., Wilton, N. H.—4 page brochure describes the types, ranges, construction details and the many improvements of superbronze non-corrosive indicating gages manufactured by this company. Illustrated. Another 4 page brochure describes and illustrates the Star deadweight gage tester.

Vibration Control. The Korfund Co., Inc., 48-15 32nd Pl., Long Island City 1, N. Y.—4 page Bulletin No. ER-701 describes and illustrates installation of a new material for controlling transmission of vibration and noise. Three types of damper are also described.

Motors. The Louis Allis Co., Milwaukee 7, Wis.—12 page Bulletin No. 611-D describes and illustrates an a-c motor having infinitely adjustable speed manufactured by this company. Sectional views of equipment, including control panel, is shown. Speed curve graphs are included.

Valves. Cooper Alloy Foundry Co., Bloy St. & Ramsey Ave., Hillside, N. J.—4-page folder contains a series of detailed engineering comparison charts designed to assist in the selection of stainless steel valves. Important features of 2 in gate valves are clearly illustrated and discussed.

Pallets. National Pallet Corp., Oliver Bldg., Pittsburgh 22, Pa.—16-page catalogue entitled "National Pallets" illustrates and describes many types of wooden pallets made by this company. Included is a map showing the location of the company's mills throughout the country and a list of cities where sales representatives are located.

Hose. B. F. Goodrich Co., Akron, Ohio—6-page catalogue Section 3740 details the methods and materials with which all fire hose of this company is constructed and advantages of their use. Pictures of the brands of industrial fire hose, data on size, couplings and test pressures are given. Gaskets, fittings and couplings used with the hose are described.

Paper Mill Equipment. Midwest-Fulton Machine Co., Dayton 2, Ohio—8-page booklet entitled "The Midwest-Fulton Line . . ." contains illustrations and brief descriptions of this company's pulper, precision beater, dryer drainage system, heat exchangers, sight-flow and visi-flow condensate indicators and autoflex syphon. Schematic drawings and charts are included.

Materials Handling. Hewitt-Robins, Inc., Robins Conveyors Div., Passaic, N. J.—4-page Bulletin No. 130 describes and illustrates the Robins Model GS car shakeout, used for unloading cars. Back page contains pictures of other materials handling equipment manufactured by this company.

Pyrometer Controller. Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.—2-page Bulletin MC-1 describes and illustrates the Multi-Switch Capacitrol indicating pyrometer controller. Suggested applications, measuring and indicating features, control functions, method of applying Wheelco electronic principle, scale ranges and technical data are covered. Specifications and prices are furnished.

Motor Drives. Westinghouse Electric Corp., Box 868, Pittsburgh 30, Pa.—8-page booklet B-2279-B describes and illustrates the regulated single motor drive for paper machines manufactured by this company. Advantages are given, and a guide for estimating power requirements for fourdrinier and cylinder machines and a speed ratio guide are included.

Turbine Pumps. Johnston Pump Co., 2324 E. 49th St., Los Angeles 11, Calif.—Two well illustrated booklets have been released by this company. Bulletin 1013 treats of the Johnston oil lubricated pumps and Bulletin 1014 explains the Johnston water lubricated pump. Applications are given for which this company's turbine pumps are designed. The text also explains how interchangeability of parts extends their utility and economy. Sectional

drawings show the component parts of the pumps, relation to each other, and modus operandi of the complete mechanism.

Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.—8-page Bulletin No. 51B6210B describes the design and construction features of the Safety-Circle motor, an enclosed unit. Illustrations, dimensions and specifications and recommended control table are included.

Alloys. American Brake Shoe Co., 230 Park Ave., New York 17, N.Y.—12-page Bulletin 449-ML recommends the alloy steel or iron best suited to meet different impact and abrasion combinations in grind mill installations in basic industries such as metal mining, nonmetallic minerals and portland cement production. Characteristics and uses of these alloys are described in detail with both charts and pictures.

Knives. Wall Colmonoy Corp., 19345 John R. St., Detroit 3, Mich.—2-page mimeographed, cover protected, booklet entitled "Colmonoy Data File" describes the hard facing of bed knives with Colmonoy No. 6. Complete details on applications are included plus sketches to show exactly where to hard face. Size of rod to use, procedures and recommended finishing methods are given.

Samples. National Bureau of Standards, Publications Section, U. S. Department of Commerce, Washington 25, D.C.—11-page booklet, circular of the Bureau of Standards, No. 398, contains general information about the function of standard samples; choice of standard materials including metals and alloys, etc.; preparation of materials; uses of standard samples; ordering and shipping regulations; and other pertinent information involving analytical operations of this bureau.

Motors. Electric Machinery Mfg. Co., Minneapolis 13, Minn.—32-page Bulletin No. 200-SYN-28 covers in four parts the basic theory, operation, characteristics and applications, and control of large induction motors. Illustrated with photographs and cut-away views and contains nearly 50 graphs with explanatory figures accompanying the text.

Casters. Bassick Company, Bridgeport 2, Conn.—4-page folder illustrates and describes this company's line of forged steel heavy duty casters. Specification tables are included.

Lift Trucks. Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio—4-page bulletin entitled Job Study No. 87 is a survey on mechanized handling of materials by this company's fork lift truck. Time study tabulations on which the charts in the survey are based are included. Illustrated.

Gearmotors. Link-Belt Co., 307 North Michigan Ave., Chicago 1, Ill.—12-page Bulletin No. 1815-A describes and illustrates gearmotors manufactured by this company. Included in the bulletin are load classification table, necessary information and considerations in selecting a gearmotor, selection table, dimensional sketches and tables, list price folder, and speed reducer data blank.

Casters. Rapids-Standard Co., Inc., Grand Rapids 2, Mich.—12-page catalogue describes and illustrates this company's line of flame-hardened and steel-forged casters and wheels. Listed are metal, plastic and rubber wheels, roller and oilite-type bearings, and heavy duty casters and Scout formed-steel casters. A cut-away view of steel-forged caster is shown. Each caster series is illustrated in both swivel and rigid models. Specification tables are included.

Corrosion Table. Fischer & Porter Co., Hatboro, Pa.—4-page Catalogue Section 97 lists recommended materials of construction for Flowrator instruments manufactured by this company. The list consists of fluids, fittings, float and packing. A table of abbreviations is given.

Hydrafiners. Shartle Bros. Machine Co., Middletown, Ohio—12-page Bulletin 7-SB describes and illustrates four models of hydrafiners manufactured by this company. Hydrafining is discussed and curve drawings of tests on cycling-refining systems are given. Diagram of typical stock-preparatory system and phantom view sketches of hydracycling system, continuous refining system, installation for batch cycling-refining, etc. are shown. A partial list of mills hydrafining stock is also included.

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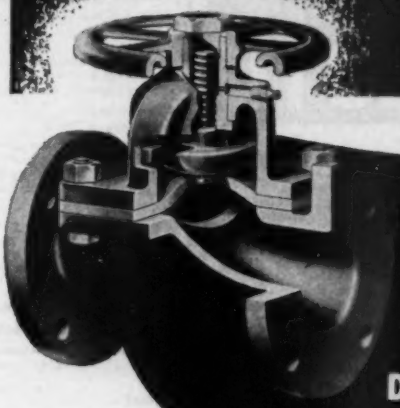

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Light Prints, No. 1	5.50 to 5.75
Khaki Cuttings—	
Bleachable	5.00 to 5.25
Unbleachable	4.25 to 4.50
New White Canvas	11.50 to 12.00
New Mixed Blacks	4.50 to 4.75
Canton Flannels, Bleached	10.75 to 11.00
Shirt Cuttings—	
New White No. 1	10.50 to 11.00
White Shrunk	10.00 to 10.25
Silesias No. 1	7.00 to 7.25
New Unbleached	10.50 to 11.00
Fancy	5.25 to 5.50
Linen Cuttings—	
American	8.00 to 8.50
White	14.00 to 15.00
Grey	13.50 to 14.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.15 to 1.20
No. 2	1.05 to 1.10
No. 3 and No. 4	.85 to .95
Twos and Blues—	
Repacked	3.00 to 3.25
Thirds and Blues—	
Repacked	2.75 to 3.00
Miscellaneous	2.25 to 2.50
Whites, No. 1—	
Repacked	4.75 to 5.00
Miscellaneous	3.50 to 3.75
White, No. 2—	
Repacked	3.50 to 3.75
Miscellaneous	2.75 to 3.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Slupperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	Nominal
Domestic	8.00 to 8.50
Wool Tares—	
Light	8.00 to 8.50
Heavy	8.50 to 9.00
No. 1 Scrap Bagging	5.75 to 6.00
Manila Rope—	
No. 1 large	5.50 to 5.75
No. 1 small	4.50 to 4.75
Sisal Rope—	
No. 1 large	5.00 to 5.25
No. 1 small	4.50 to 4.75
New Burlap Cuttings	7.50 to 8.00
Jute Threads—	
Foreign (Nom.)	6.50 to 7.00
Domestic	6.00 to 6.50
Strings—	
No. 1 sisal	4.50 to 4.75
No. 2 sisal	4.00 to 4.25
Soft jute	4.25 to 4.50
Mixed	2.50 to 2.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

Shavings—	per ton
Hard White Env. Cuts.	95.00 to 100.00
Hard White, No. 1	75.00 to 80.00
Soft White No. 1	70.00 to 75.00
Soft White, one-cut	85.00 to 90.00
Soft White, Misc.	55.00 to 60.00
Fly Leaf, No. 1	27.50 to 30.00
Fly Leaf, Woody No. 1	22.50 to 25.00
No. 2 Mixed Col. Woody	17.50 to 20.00
Flat Stock—	
No. 1 Heavy Books and Magazines	18.00 to 19.00
Mixed Books	13.00 to 14.00
Ledger Stock—	
No. 1 White	40.00 to 45.00
No. 1 Mixed (Colored)	30.00 to 35.00
Manilas—	
New Env. Cuttings	60.00 to 65.00
New Env. Cuts, One-Cut	—
Extra Manilas	—
Manila Tab Cards, Free of Ground Wood	65.00 to 70.00
Colored Manila Tab Cards	35.00 to 40.00
Kraft—	
New Envelope Cuttings	60.00 to 65.00
Tripled Sorted No. 1 100%	30.00 to 35.00
New 100% Cor. Cuts	30.00 to 35.00
No. 1 Old Assorted	25.00 to 27.50
News—	
White Blank	45.00 to 50.00
Overissue	14.00 to 15.00
No. 1 Baled	10.00 to 11.00
Old Corrugated Containers	16.00 to 18.00
New Jute Corrugated Cuts	20.00 to 22.00
Mill Wrappers	6.00 to 7.00
Box Board Chips	5.00 to 6.00
No. 1 Mixed Paper	5.00 to 6.00

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.05—
Ground, cwt.	3.80—
Powdered, cwt.	4.20—
Blanc Fixe—	
Pulp, bulk, ton	77.50—
Dry, barrels	85.00—
Bleaching Powder—	
Drums, cwt.	4.25 to 4.50
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	20.50 to 21.00
Argentine, lb.	19.25 to 19.50
China Clay—	
Domestic Filler	
Bulk (mine) ton	10.00 to 15.00
Domestic Coating	
Bulk (mine) ton	15.00 to 25.00
Imported (ship side)	
Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.40 to 2.70
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	.24¼ to .25
Litharge, powd. bbl. lb.	.16¾ to .17¾
Rosin (Gum)—	
New York, per 100 lbs.	
E	7.60—
F	7.60—
G	7.60—
WWX	7.70—
Rosin (Wood), carlots, F.O.B. South	4.25 to 4.50

MARKET QUOTATIONS

Salt Cake—	
Dom. bulk (wks) ton	22.00 to 24.00
Imp. bulks on dock— (Atl. ports) ton (Nom.)	25.00—
Soda Ash—	
Bulk (works), cwt.	1.10 to 1.20
Paper Bags, cwt.	1.35 to 1.40
Barrels, cwt.	1.70 to 1.80
Soda (Caustic)—	
Solid drums, cwt.	3.05 to 3.10
Ground and flake, drums, cwt.	3.45 to 3.50
Sodium Silicate—	
60 deg. 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg. 55 gal. drums, (works), cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	4.82—
Pearl, barrels, cwt.	4.82—
Paper, (8p.) bags, cwt.	4.82—
Powdered, barrels, cwt.	4.93—
Sulphur (Crude)	
(Mine) bulk, long ton	16.00 to 18.00
Talc—	
Dom. 100 lb. bags (mine) ton	22.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig, bbls., lb.	.19½ to .21
Calcium Pig, bbls., lb.	.19½ to .21
Zinc Sulphide, bbls., lb.	11.50 to 11.75

WOOD PULP

Prices, dollars per short, air dry, ton, on dock American ports and f.o.b. shipping points with former OPA freight allowances, are:

Bleached sulphite, Swed.	118.00 to 122.00
Bleached sulphite, Finish.	118.00—
Bleached sulphite, dom.	118.00—
Easy bleaching sulphite	—
Unbleached kraft, Finn.	94.00—
Unbleached sulphite, Swed.	100.00 to 105.00
Unbleached sulphite, Fin.	115.00—
Unbleached sulphite, dom.	100.00—
Unbleached kraft, Swedish	94.00 to 97.00
Unbleached kraft, northern	94.00 to 105.00
Unbleached kraft, southern	80.00—
Bleached sulphate, Swedish	126.00 to 128.00
Bleached soda, domestic	113.00—
Sulphite screenings, dom.	40.00 to 50.00
Sulphate screenings, dom.	40.00 to 50.00
Groundwood, domestic and Canadian	60.00 to 65.00

PAPER

f.o.b. New York City

Boards—	per ton
Binders	94.00—
Chips	70.00—
Chip, tube and can	75.00—
Chip, full blending	77.50—
Chip, sgl. mla. lined	77.50—
Coated, white patent	
.018	110.00—
.020 and heavier	100.00—
Kraft liner	95.00 to 105.00
Filled News	72.50—
Container	85.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)
Uncoated (Untrimmed)

Book, White (M. F.)—	
A Grade E. F.	15.40—
B Grade E.F.	14.90—
A Grade S. C.	15.90—
B Grade S. C.	15.40—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White (Trimmed 4 sides)	
No. 1 Glossy	20.75—
No. 2 Glossy	19.50—
No. 3 Glossy	18.15—
No. 4 Glossy	—
No. 2 Offset	14.60—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond— (In Ton Lots)	per cwt.
Extra 100% Rag	51.40—
100% Rag	44.55—
75% Rag	33.90—
50% Rag	28.10—
25% Rag	24.85—
Rag Content Ledger— (In Ton Lots)	per cwt.
Extra 100% Rag	52.65—
100% Rag	45.65—
75% Rag	35.15—
50% Rag	29.40—
25% Rag	26.15—
Sulphite Bond—	per cwt.
Air dry, watermarked	—
No. 1 watermarked	17.50—
No. 2 watermarked	16.60—
No. 4 watermarked	15.60—
Sulphite Ledger—	per cwt. Zone
No. 1 watermarked	18.80—
No. 2 watermarked	18.05—
No. 4 watermarked	17.50—
Glassine (f.o.b. mill)—	per cwt.
Embossed (25 lb. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof—	
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
News—	per ton
Rolls, Standard Contract	102.00 to 103.00
Rolls (Spot)	(Nominal)
Sheets	119.00—
Tissues (Carlots)—	per ream
White No. 1	1.60—
White No. 2	1.30—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.45—
Manila	1.60—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.80—
Napkins, full crepe and smk'sed (12½ lb. to M shts.) per cs.	.80—
Toilet, Bleached (M. shts.) per cs.	8.75 to 10.00
Toilet, Unbleached (M. shts.) per cs.	7.50 to 10.00
Towels—	per case
Bleached	5.25—
Unbleached	4.50—
Wrappings (Kraft)—	per cwt.
Super-Standard	8.00 to 8.50
No. 1 Wrapping	7.00 to 7.50
Standard Wrapping	6.25 to 6.75
Standard Bag	5.75 to 6.25
Variety Bag	—
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f.o.b. mill)	
Bleached Papers—	per cwt.
M.F. & M.G. Waxing, 30 lb. (Carloads only)	—
(10,000 lb.)	—
Drug wrapp., 35 lb.	—
Unbleached Papers—	
Com. Gr. Butch. 40 lb.	—
No. 1 Butchers	—
No. 1 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
No. 2 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
Steam Finish, 50 lb.	—
Water Finish, 50 lb.	—
Manilas—	
Envp. Mla., Sub. 16-40 (No. 1)	—
Envp. Mla., Sub. 16-28 (No. 2)	—
Envp. Mla. (Prices based on large sheets untrim'd ream marked, in bdls.)	—
Wrapp Mla. 35 lb. up—	
No. 1	—
No. 2	—
M.G. Sulphite and Kraft (other than Waxing)	
Grade B20 lb.	—
Grade A-22 lb.	—

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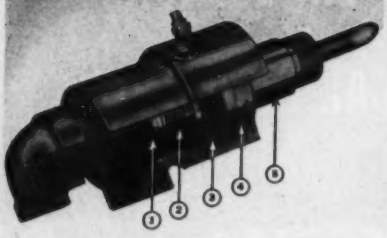

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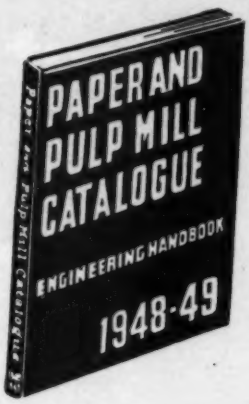

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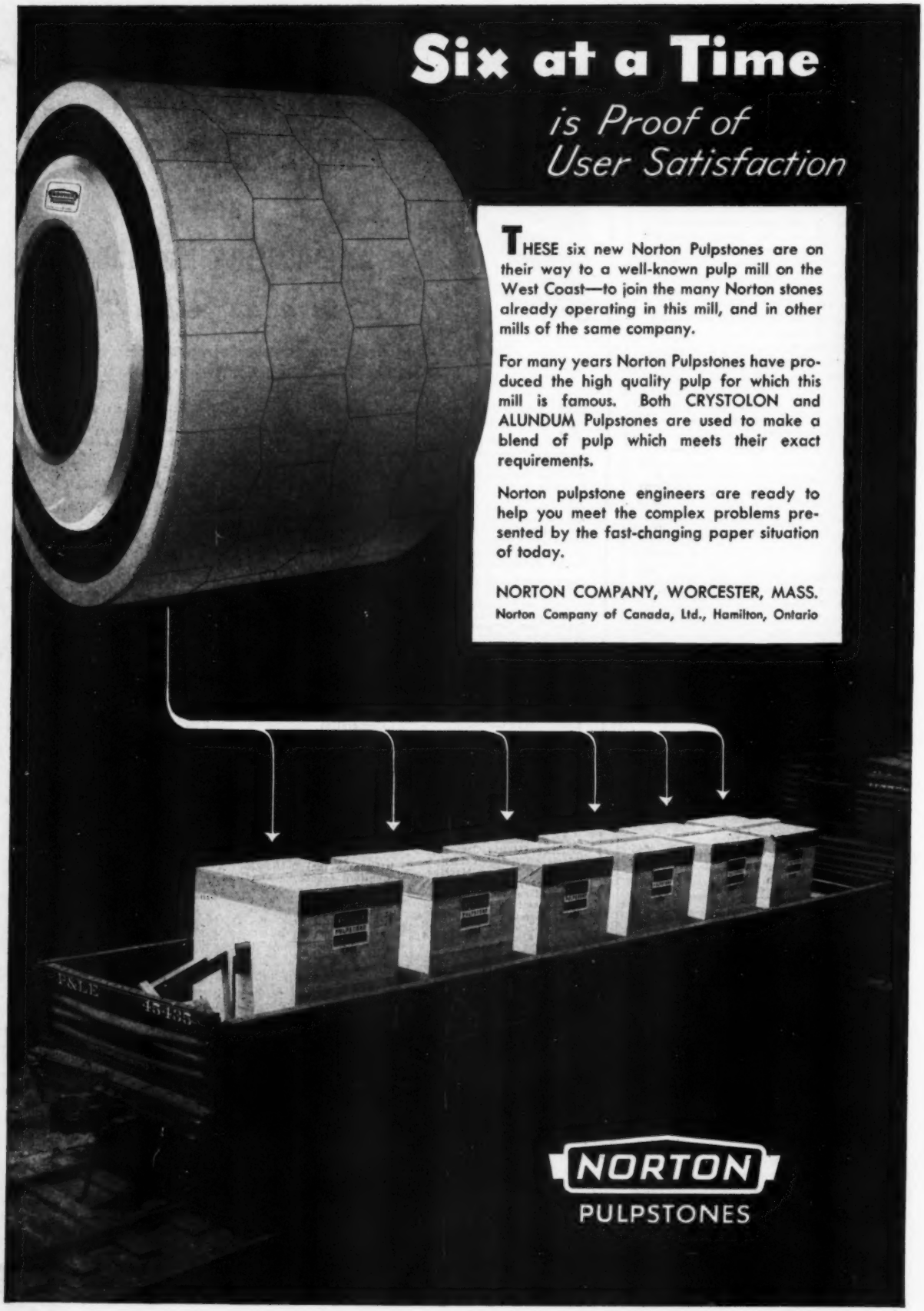
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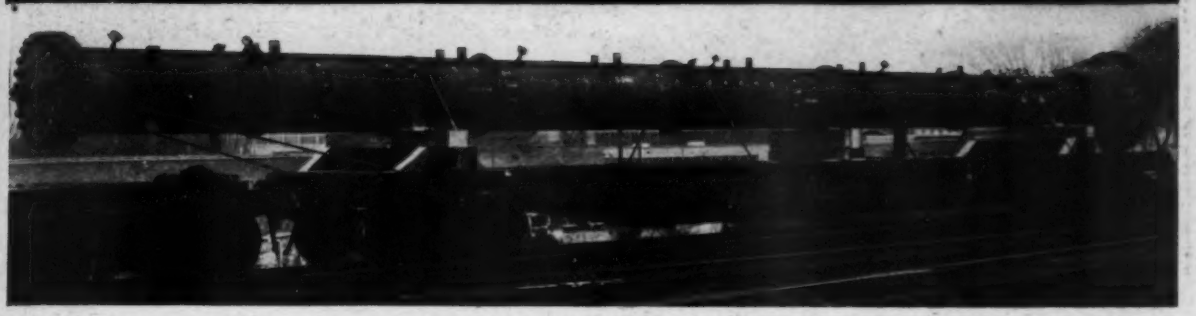

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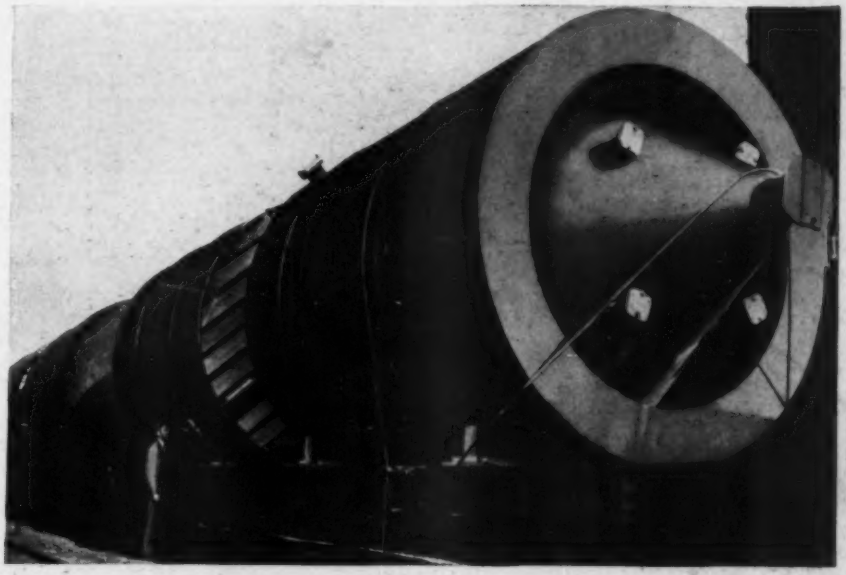

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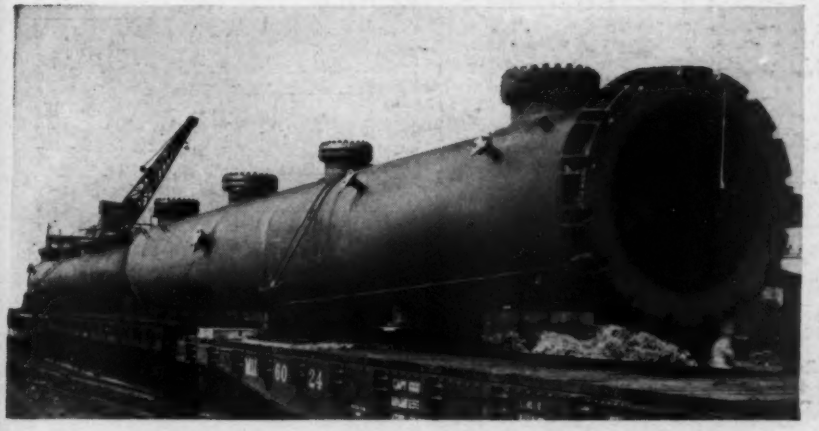

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Write the nearest A. O. Smith office listed at the top of this page for these new A. O. Smith Bulletins:

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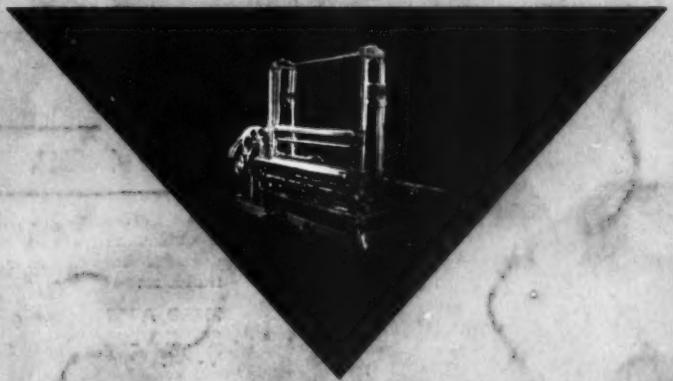

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